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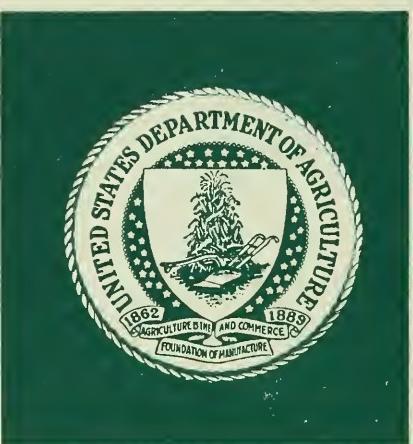
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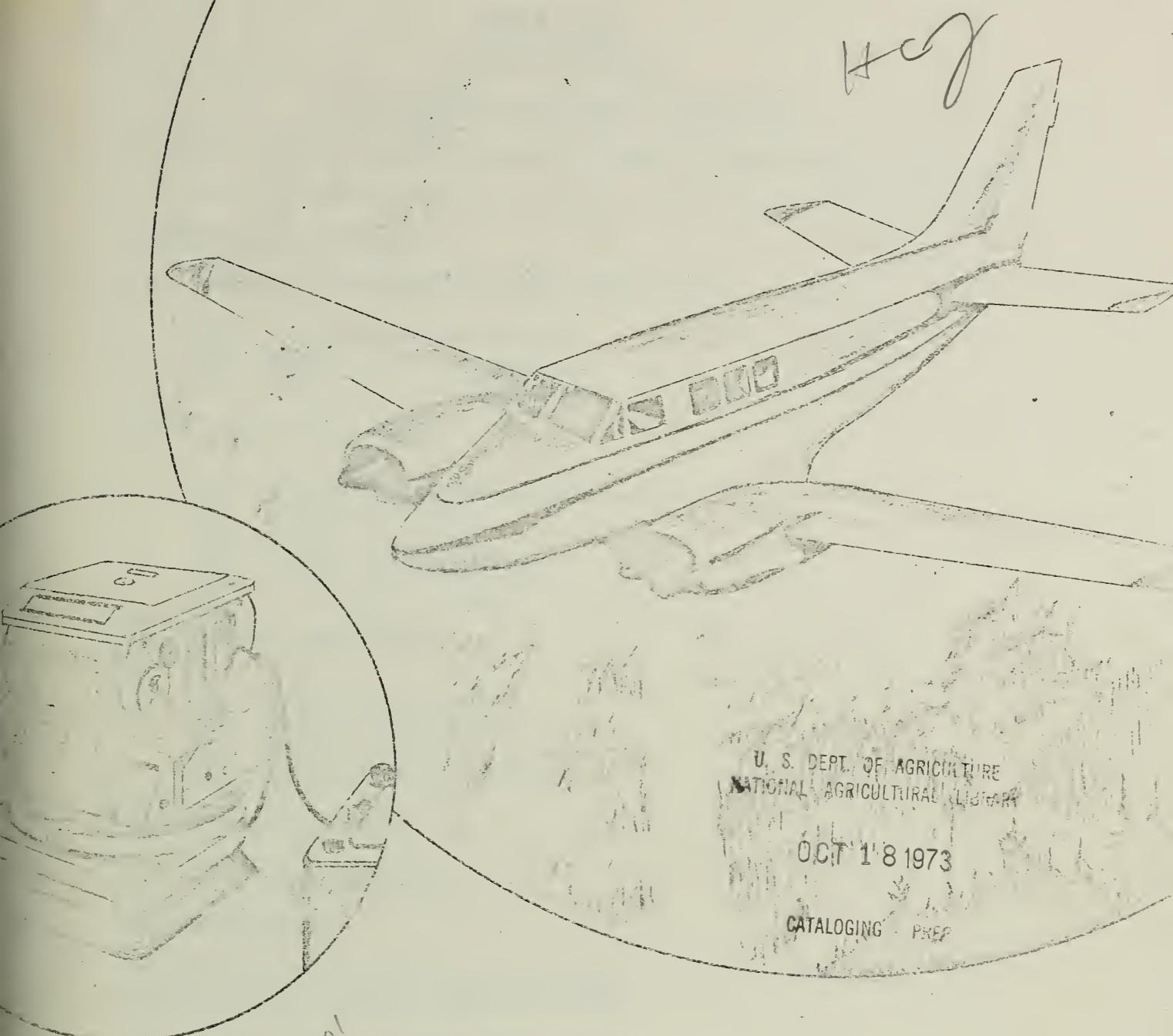
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SPECIFICATIONS FOR AERIAL PHOTOGRAPHY

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U.S. Forest Service
U.S. Department of Agriculture

January 31, 1969

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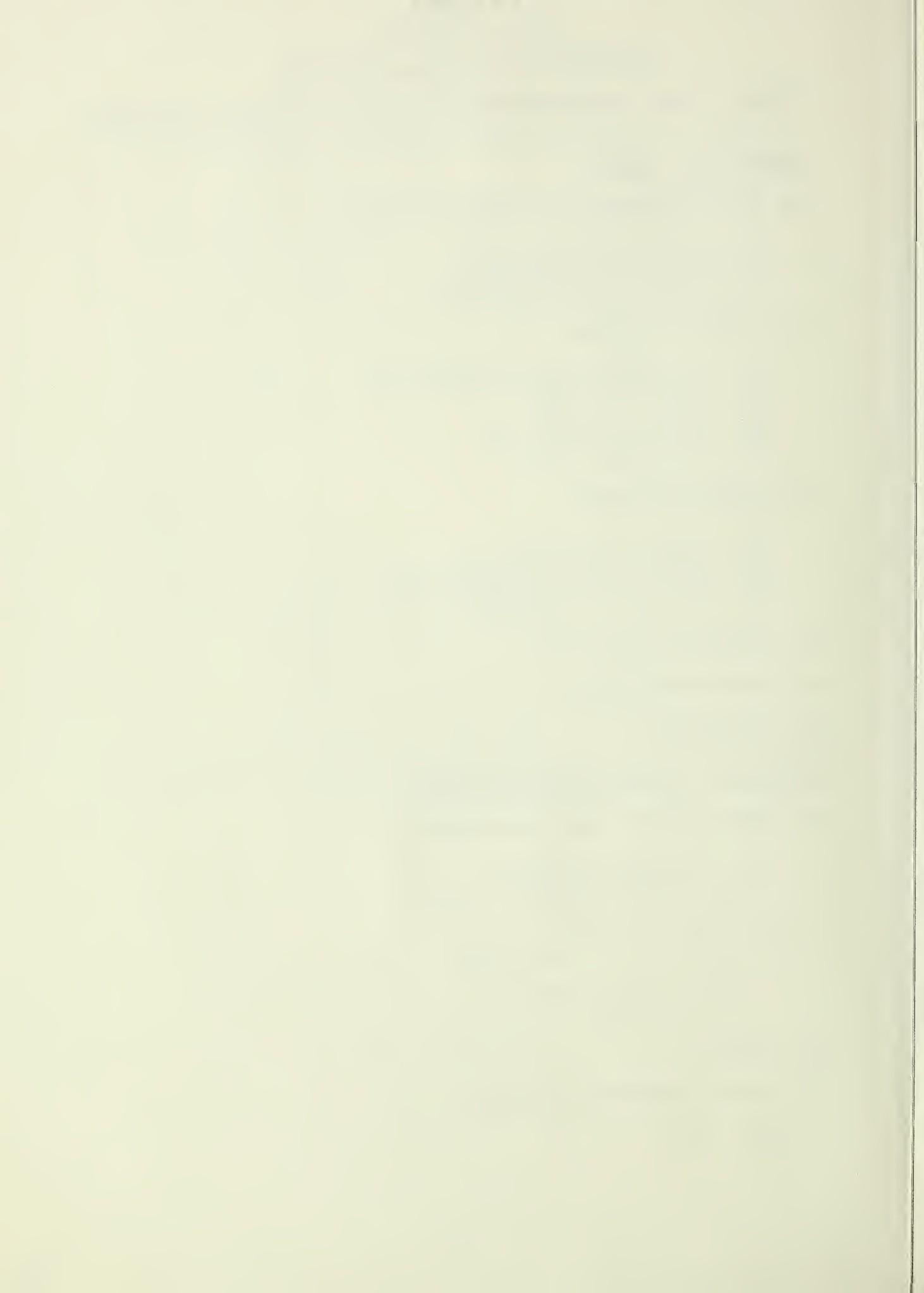
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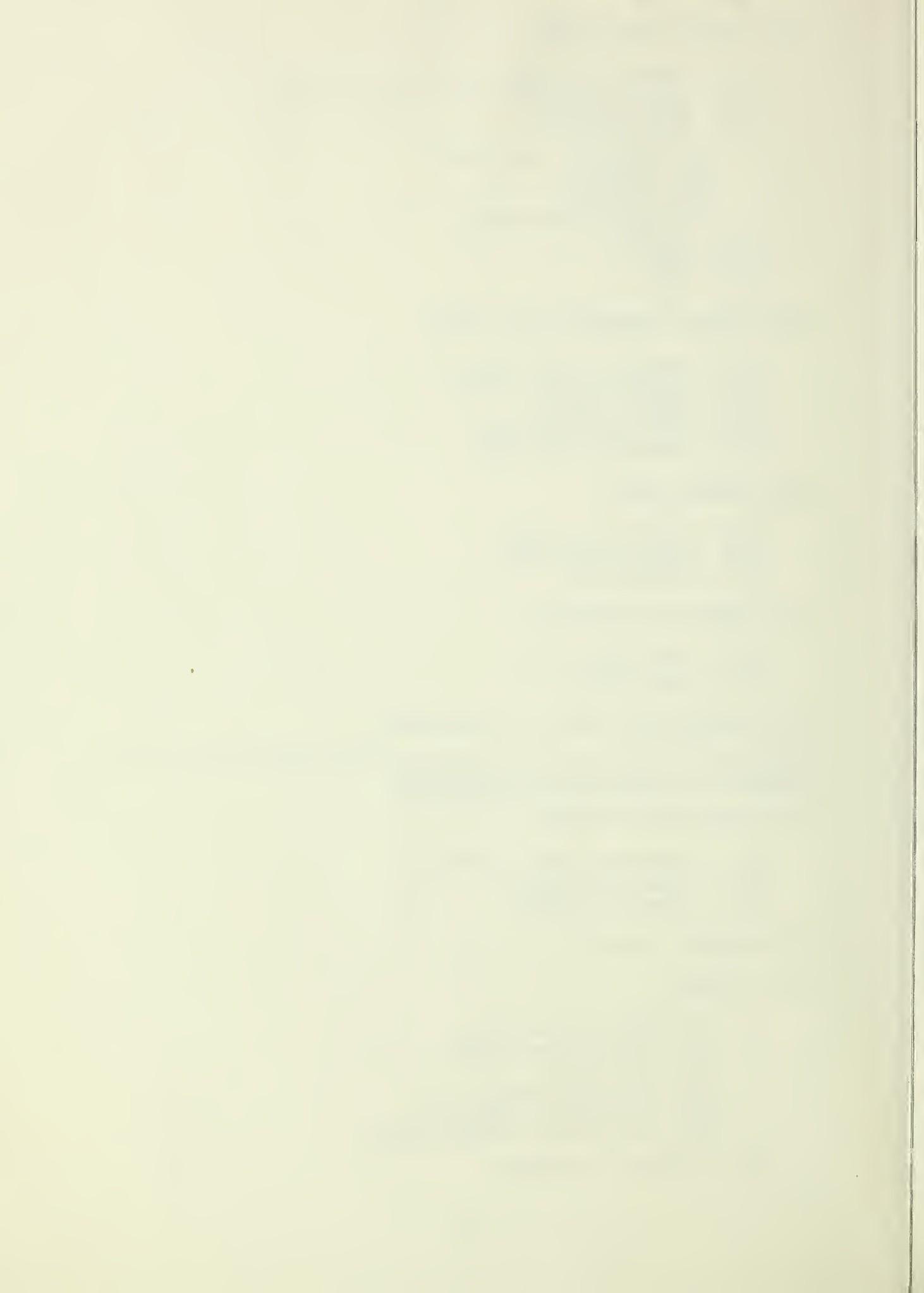
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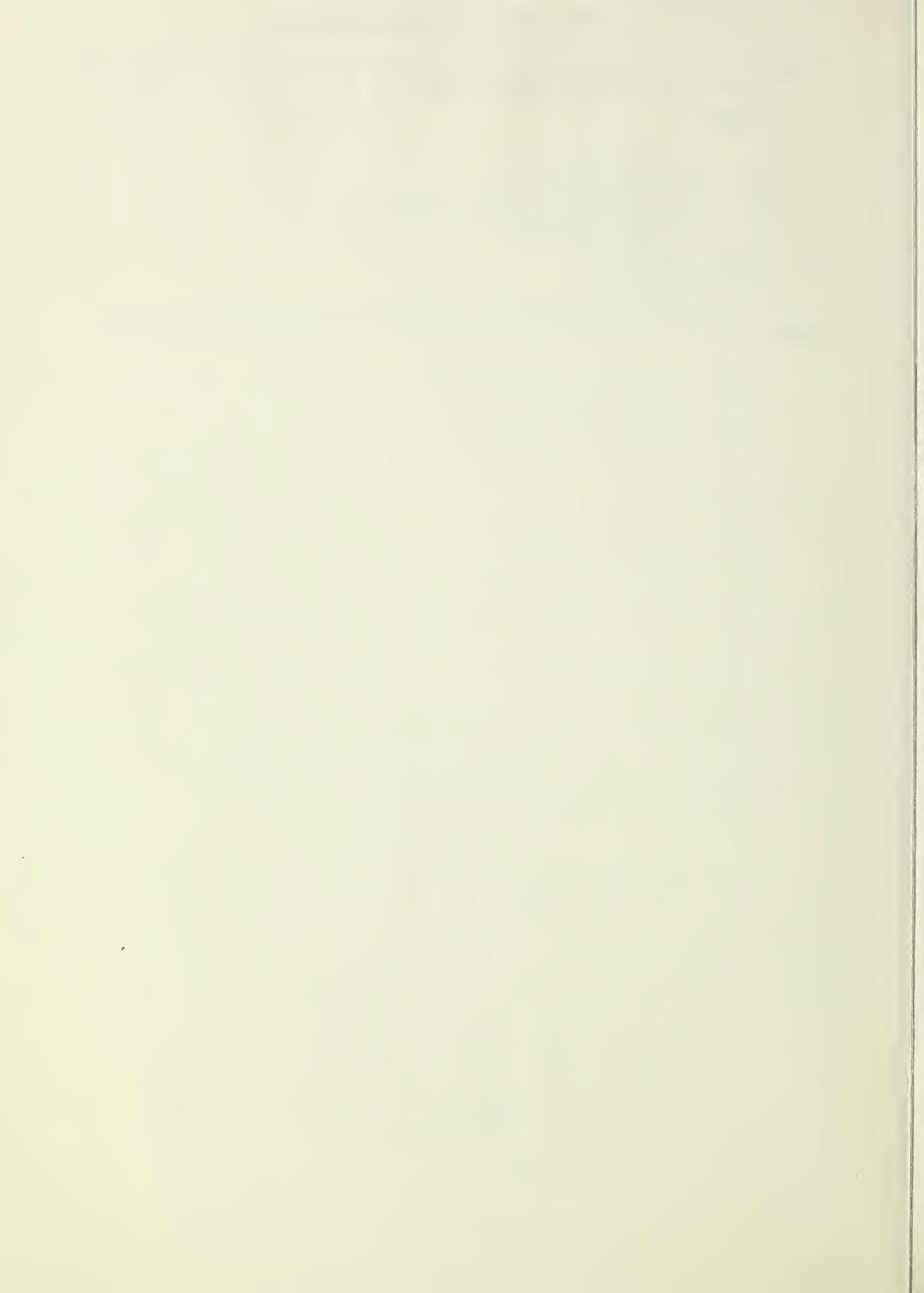
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FOREWORD

Bidder Qualifications for Forest Service Aerial Photography

I. General.

Forest Service solicitations for aerial photography are sent only to those responsible aerial photography firms who have been pre-qualified and listed on the Forest Service Aerial Photography Prospective Bidder List maintained in the Washington Office. In order to prequalify as a prospective bidder for Forest Service aerial photography projects, interested firms are required to submit the information and materials specified below to the following office for review and acceptance or rejection:

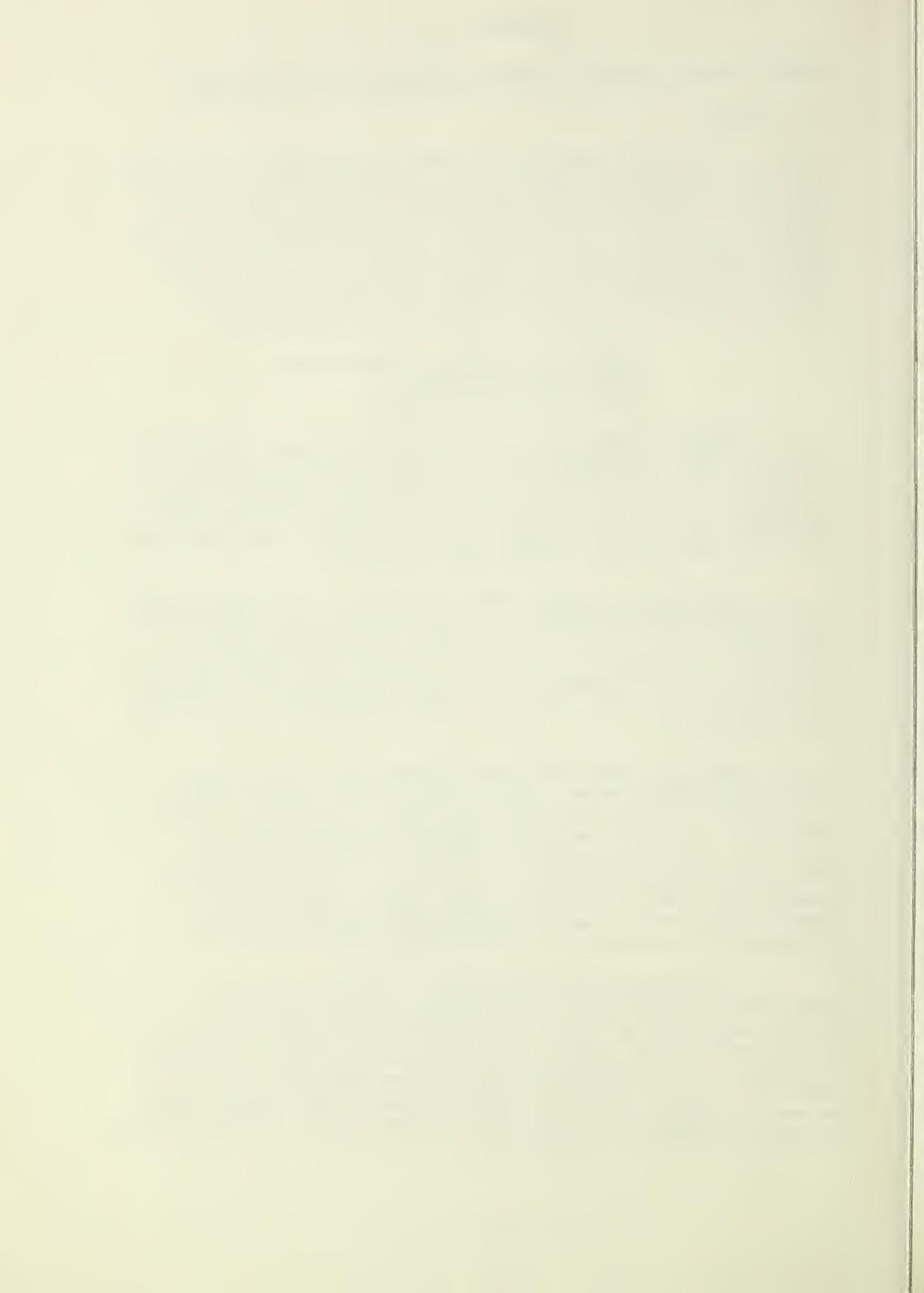
Director, Division of Engineering
Forest Service, USDA
Washington, D. C. 20250

A. Financial Statement. Each interested bidder shall submit a certified statement of his current financial condition. Statements shall be certified by a responsible officer or owner of the firm and shall represent a true statement of the firm's financial status as of the date of certification. New statements shall be required each calendar year thereafter.

B. Statement of Facts. Each interested bidder shall submit a certified statement of facts listing equipment, personnel, and other facilities which he has available. Statements shall be certified by a responsible officer or owner of the firm and shall represent a true statement of the facts submitted as of the date of certification. New statements shall be required each calendar year thereafter.

C. Samples. Each interested bidder shall submit sample materials as listed below. Those samples which, in the judgment of the Forest Service, are deficient shall be rejected. To be useful for comparative analysis, samples submitted shall be vertical, of medium scale (1/10,000 to 1/20,000), of timbered areas, and exposed between 11 a.m. and 1 p.m. local time. All samples shall bear the bidder's name, camera number, shutter speed, f stop, filter used, flight height, date and hour of photography, and geographic area photographed.

1. Samples (Black and White). Two polyester base panchromatic negatives and two infrared emulsion negatives on acetate base shall be submitted as samples of quality and density of the negatives the bidder proposes to furnish under contract. One sample of each emulsion shall represent the thinnest, and the other, the densest negative to be furnished. These samples shall be used as criteria for negatives delivered by the successful bidder in case of dispute as to quality.

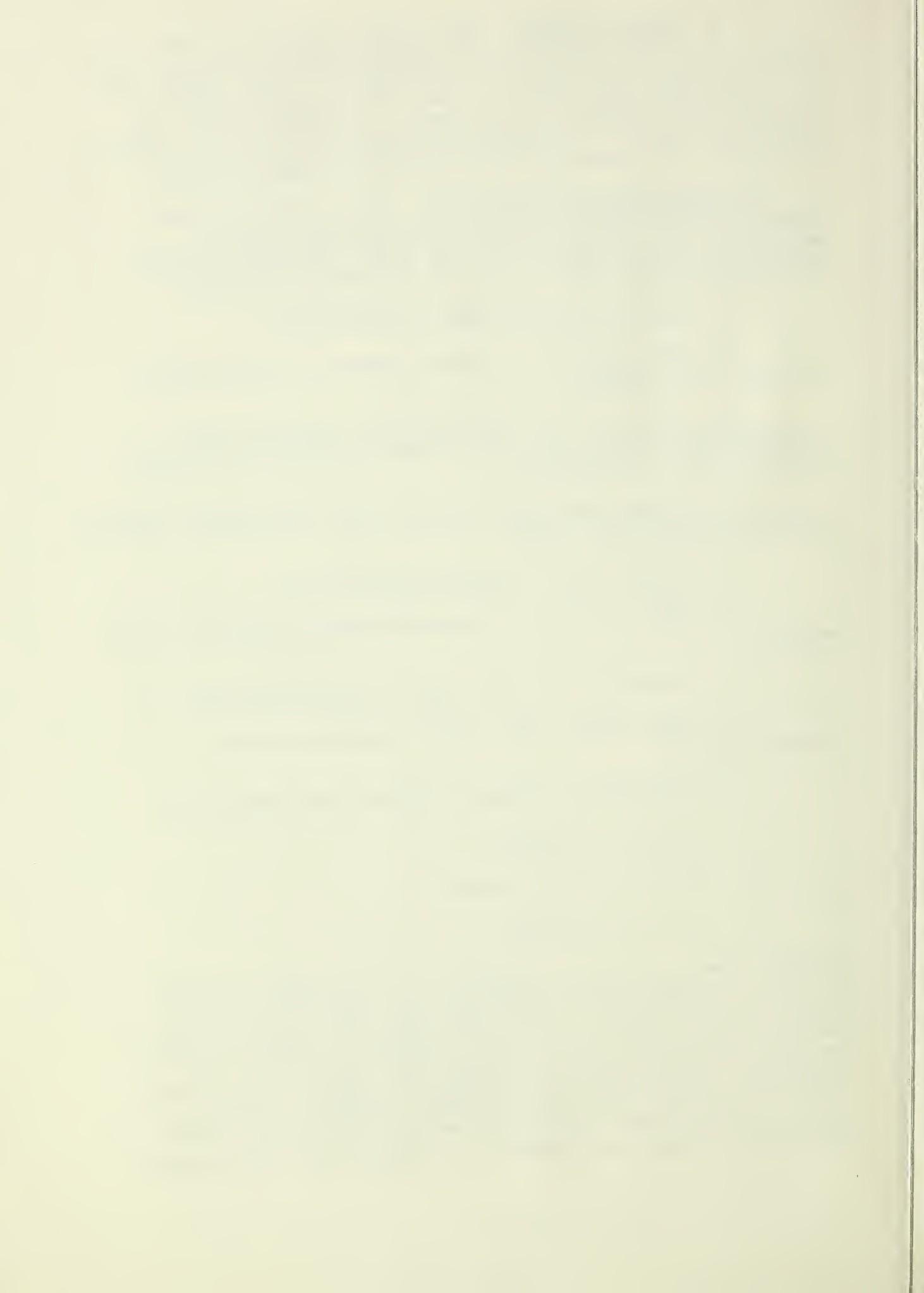


2. Samples (Color). Three sample overlapping color prints and the corresponding color negatives taken with each camera and filter proposed for use shall be submitted. These samples will be evaluated for color quality, color balance, proper exposure, density, and uniformity of illumination. Submitted samples will be used as standards of desirable color quality, and color materials delivered by the successful bidder shall be of equal quality.

D. Camera Report of Calibration. Each interested bidder shall submit one copy of a Report of Calibration from the National Bureau of Standards for each camera he proposes to use. Such camera reports shall include the following information:

1. Calibrated focal length in millimeters.
2. The tangential and radial values of resolving power at 5° or 7.5° intervals.
3. Values of the radial distortion referred to the calibrated focal length, for each of four (4) radii of the focal plane at 5° or 7.5° intervals.
4. Average radial distortion for each field angle, referred to the calibrated focal length.
5. Maximum value of tangential distortion.
6. Value of distance separating opposite pairs of fiducial markers.
7. Location of principal point of auto-colimation.
8. Angle between lines joining opposite pairs of fiducial markers.
9. Parallelism of filter or filters used during test.
10. Planeness of platen.
11. Effective shutter speed.
12. Shutter efficiency.

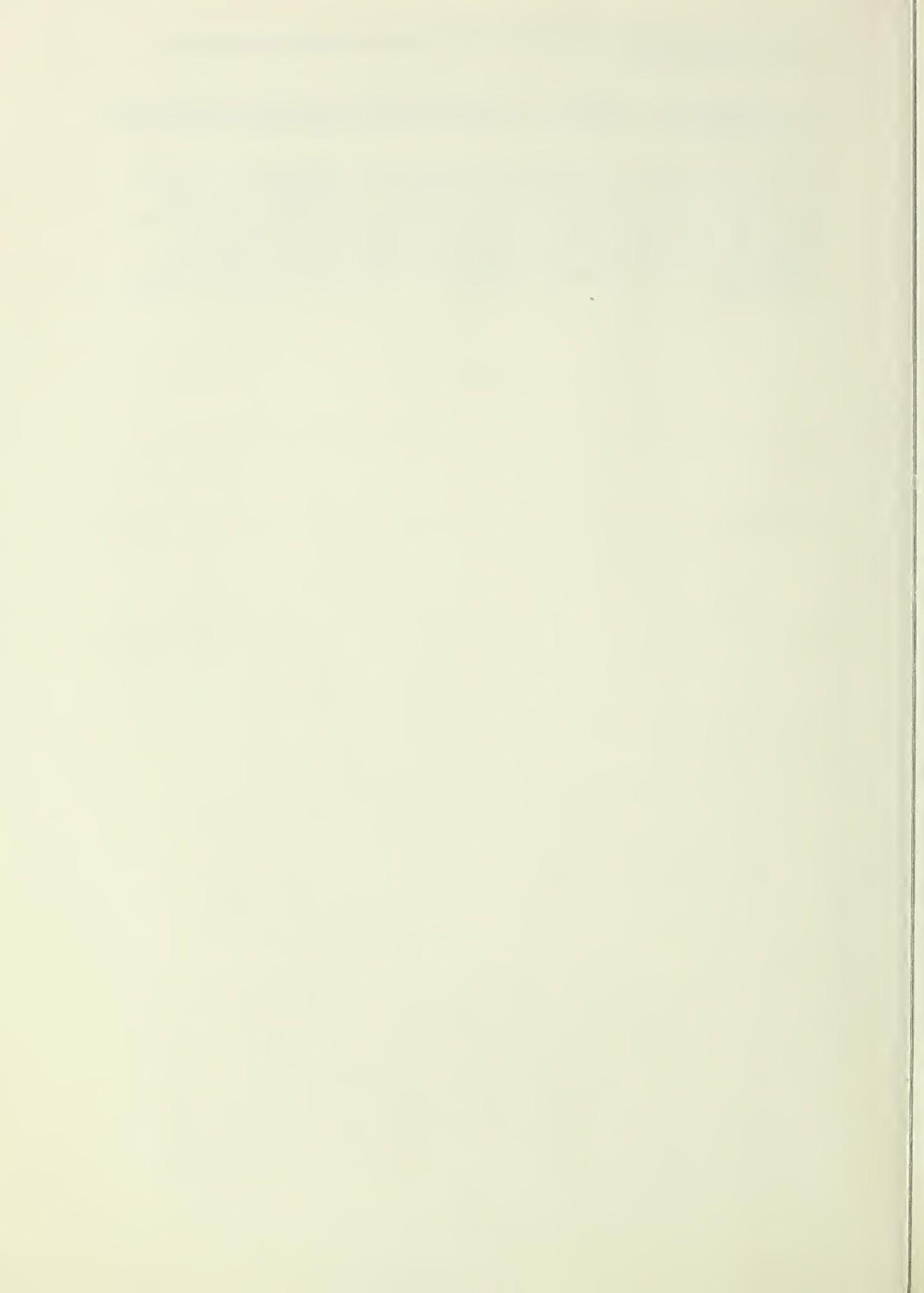
A camera report will not be acceptable after two years from date of issue. A camera report will also not be acceptable if it is known that any component of the lens, lens cone, or focal plane assembly has been damaged, repaired, adjusted or changed in any-way since the previous testing. Cameras covered by such "not acceptable" reports shall be retested and a copy of the new report shall be furnished to the Forest Service. NOTE: All cameras which interested bidders propose to use on Forest Service aerial photography projects shall comply with Section 210, Aerial Mapping



Camera Requirements, of the Forest Service Specifications for Aerial Photography.

II. Alternate Procedure for Submission of Qualifying Information and Materials.

As an alternate to the above procedure, an interested bidder who wishes to bid on a Forest Service aerial photography project may submit the information and materials specified above with his bid. In any case, failure on part of bidder to submit all required items to the Forest Service either prior to the bid opening or with the bid may cause his bid to be rejected as non-responsive.



SPECIFICATIONS FOR AERIAL PHOTOGRAPHY

DIVISION 100 - GENERAL

110. BASIC REQUIREMENTS FOR AERIAL PHOTOGRAPHY

111. CONTRACTOR REQUIREMENTS

The contractor shall furnish all necessary materials, supervision, labor, equipment, and transportation, and shall execute and finish the aerial photography of the area under contract and shall deliver all photographic materials as specified herein and in the Solicitation. All work shall be executed in an expeditious and workmanlike manner in accordance with these Specifications and other conditions set forth in the Solicitation. Photographic materials delivered by the contractor which do not meet all requirements of these Specifications may be rejected by the Government. The contractor shall furnish acceptable replacement materials for all photographic materials rejected by the Government, including any transportation costs incident thereto.

112. PHOTOGRAPHIC CONDITIONS

Photography shall be undertaken only when the skies are clear and free from clouds or smoke and well-defined images can be resolved. The ground shall be free from fog, snow, standing water (other than natural or man-made ponds and lakes) and flood water, from streams which have overflowed their normal banks. Photography shall be undertaken only during that portion of the day when the minimum sun angle has been exceeded.

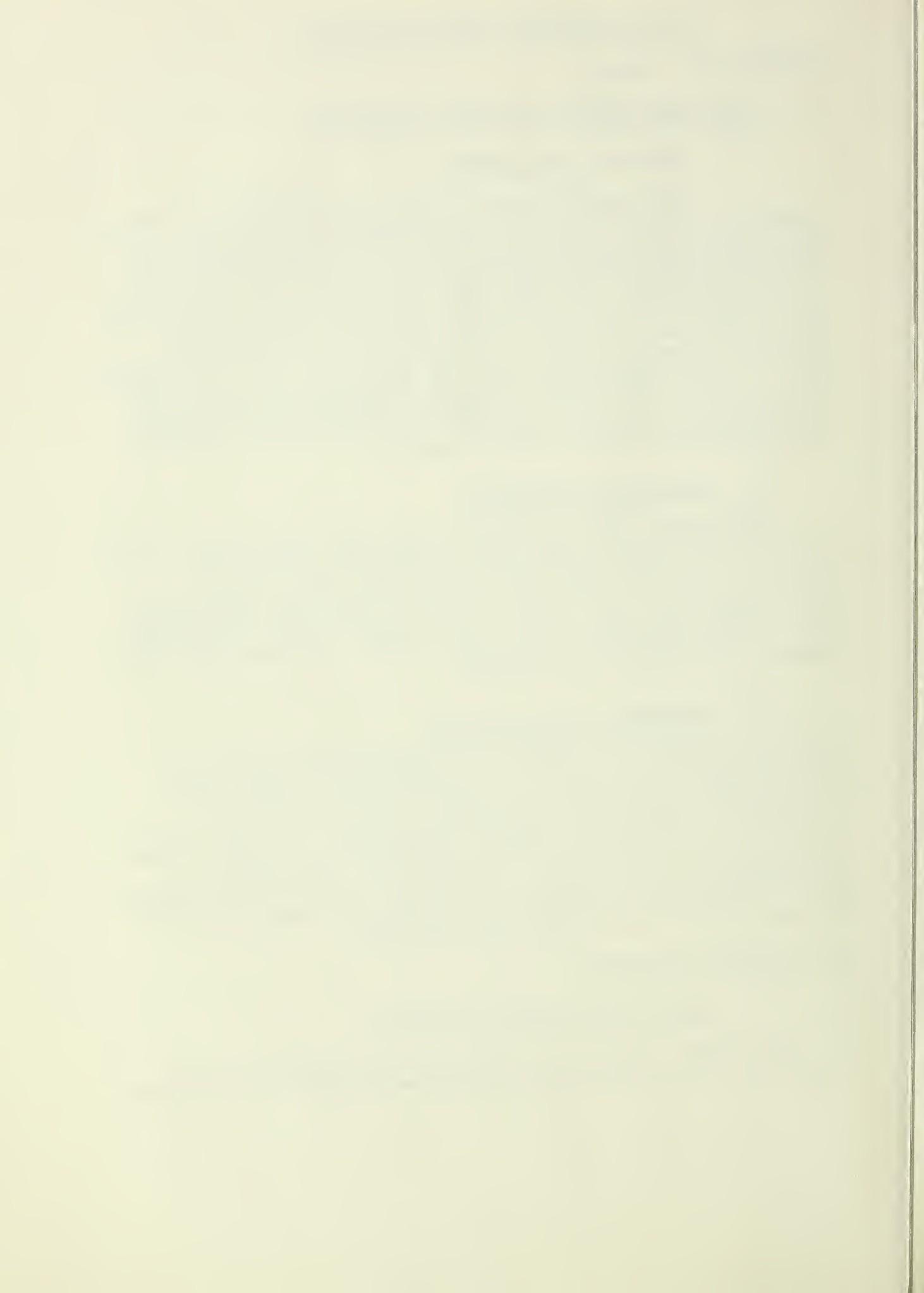
113. REQUESTS FOR CLARIFICATION

Bidders are expected to examine the specifications and maps, to visit the locality of the work if necessary, and to make their own estimates of the facilities needed and the difficulties attending the execution of the proposed contract including local conditions, uncertainty of weather, availability of landing fields, and all other contingencies. Any request for clarification or interpretation of any portion of the specifications or solicitation shall be submitted in writing in accordance with clause 3, of SF-33A, Solicitation Instructions and Conditions.

120. PROJECT DESCRIPTORS

121. Project Solicitation Information

The project designating symbol for each item area will be indicated in the Solicitation or otherwise furnished the contractor.



The negative scale and lens focal length will be indicated in the Solicitation. The minimum sun angle will be indicated in the Solicitation. Filters shall be of the style and type specified in the Solicitation. Color balance filtration used shall be that recommended by the manufacturer for the particular emulsion batch in use, and it shall be in addition to any filtration used to minimize vignetting, or to minimize haze.

122. Areas to be Flown

The locations, dimensions, and sizes of the areas to be photographed are set forth in the Solicitation and the approximate locations of the areas are shown on the maps attached thereto. Any reflights required due to incorrect placement of flight lines or incorrect photographic flight altitude assigned to each flight line, or, in the case of resource projects, portions thereof, furnished to the contractor by the Government shall be at Government expense.

123. Flight Line Maps

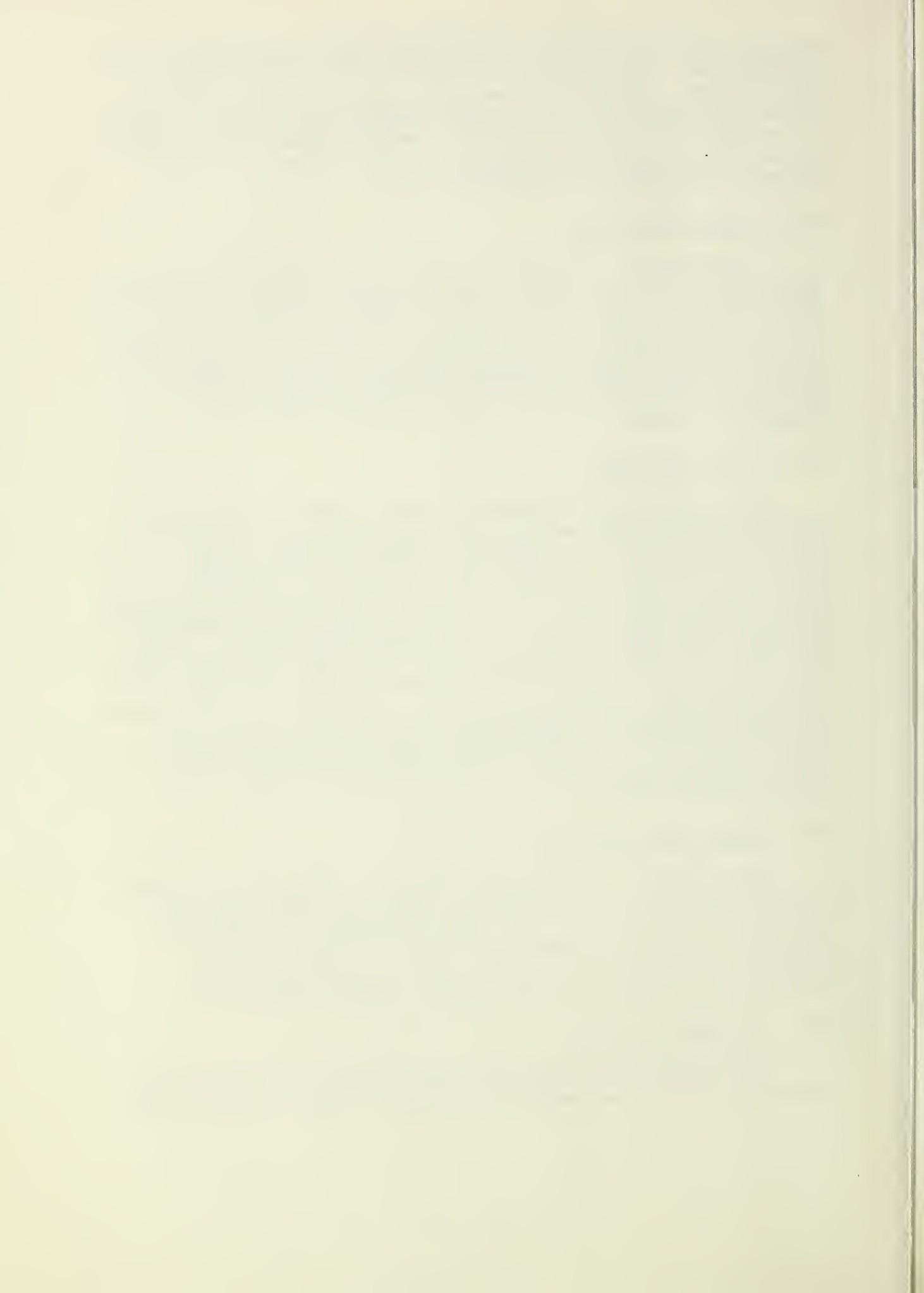
Contractor will be furnished three (3) sets of 1:250,000 scale Army Map Service maps for the areas awarded. One set of these maps will show the length and location of each flight line to be flown and the elevation of each line (or portion thereof) above mean sea level. When specified in the Solicitation, Forest Series maps ($1/2" = 1$ mile) will be provided the contractor as Flight Line maps in lieu of the 1:250,000 AMS series. While the flight elevation is normally level and fixed, there are cases where an inclined flight line is desired to hold a constant scale over rising or dropping terrain. In these cases, the Flight Line map will give the elevations at various points along the flight line and the gradient between these controlling points. These inclined flight lines may have designated breaks in the flying height assigned.

124. Flight Line Direction

The direction of flight for all areas shall be as indicated in the Solicitation and as shown on copies of flight line maps furnished the contractor. The right is reserved to change the direction of flight in those cases where a change is found necessary. Notice of such change shall be in accordance with provisions of Clause 2 of Form 6300-38, General Provisions.

125. Photographic Season

The photographic season for each calendar year during which photography may be secured for item areas is based on the average



dates when snow and/or foliage conditions are such that photography suitable for use by the Government may be obtained. The actual conditions may vary from year to year and the contractor will be furnished estimated changes in these dates upon request to the Government. Actual dates for starting and discontinuing photographic operations will be furnished the contractor as soon as such dates are determined.

130. PROJECT PROSECUTION

131. Notice to Proceed

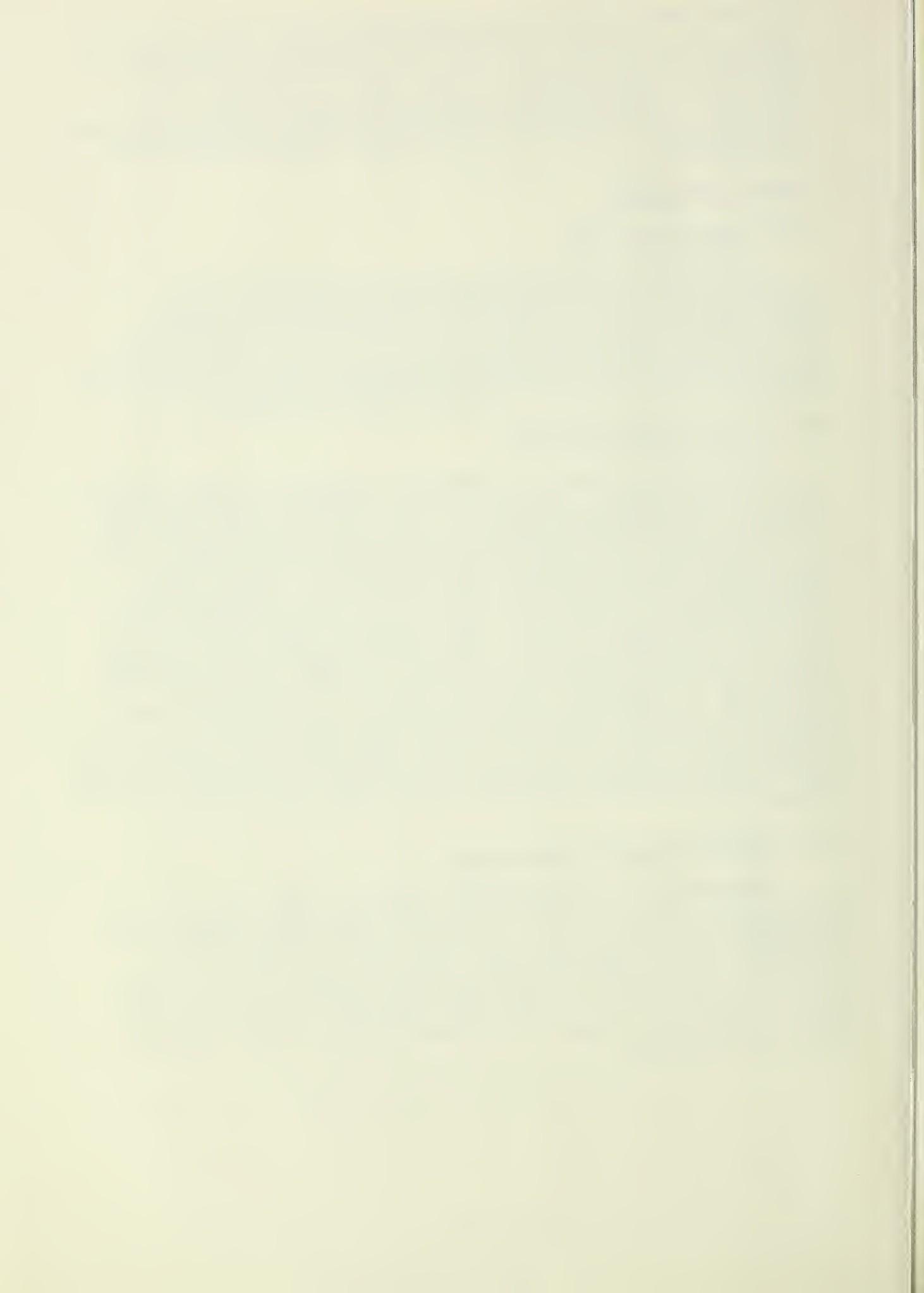
The notice to proceed will be sent by registered mail, telegram, or telephone, confirmed by registered mail, promptly after submission of an acceptable performance bond, and based on the specified photographic season, and prevailing weather conditions. No photography of any area shall be undertaken before the Notice to Proceed is given, or after a Stop Work Order is issued.

132. Weekly Progress Reports

Weekly Progress Reports showing the progress of aerial photography on each contract item for each week ending Saturday shall be mailed to the Contracting Officer as directed in the Contract, with a duplicate copy to the Division of Engineering, Forest Service, U. S. Department of Agriculture, Washington, D. C. 20250. Such reports shall be air mailed not later than Monday midnight of the succeeding week. A report is required from each photographic crew assigned to the Contract Item. Such reporting shall start with the week the contractor receives the Notice to Proceed for the item and reports shall be furnished for each week thereafter until the photography is completed or until the end of the photographic season. Reports are required during this period even though crews are temporarily not maintained on the item. When crews are not maintained on the item, the report should so state and give the reasons. Reports shall not be considered acceptable unless completely and legibly filled out.

133. Maximum Period for Photography

Photography of an item shall be completed within the first two photographic seasons following the date of the contract award except as provided in paragraph 134. It is the expressed intent of the Government that all photography of a Contract Item will be completed in the first photographic season if at all possible and in no event later than the earliest feasible date within the second photographic season, which shall include all reflights ordered by the contractor and/or the Government.



134. Termination for Default

If acceptable photographic materials for the entire item have not been secured by the end of the period specified in paragraph 133 and shipped within the time allowance stated in Section 320, the contract will be subject to termination for default in accordance with Clause 3 of Form 6300-38, General Provisions.

140. OWNERSHIP OF NEGATIVES

All negatives shall become the property of the Government and shall be delivered in accordance with the provisions of the contract. The contractor shall not, unless so directed by the Contracting Officer, remove or fail to deliver any rejected negatives from a roll containing accepted negatives.

Entire rolls of Contractor rejected or Government rejected mapping photography film shall be delivered. Entire rolls of contractor-rejected or Government-rejected resource photography film need not be delivered if classified areas are not involved. While the negatives are in the possession of the contractor, and with the prior approval of the Contracting Officer, he may make for commercial use such prints, enlargements, mosaics, and reproductions as he may desire from any such negatives which do not show classified areas, the photographing of which is prohibited by the Government. Prior to commercial use, the contractor shall remove all Agency identification and designating symbol.

150. SECURITY REQUIREMENTS

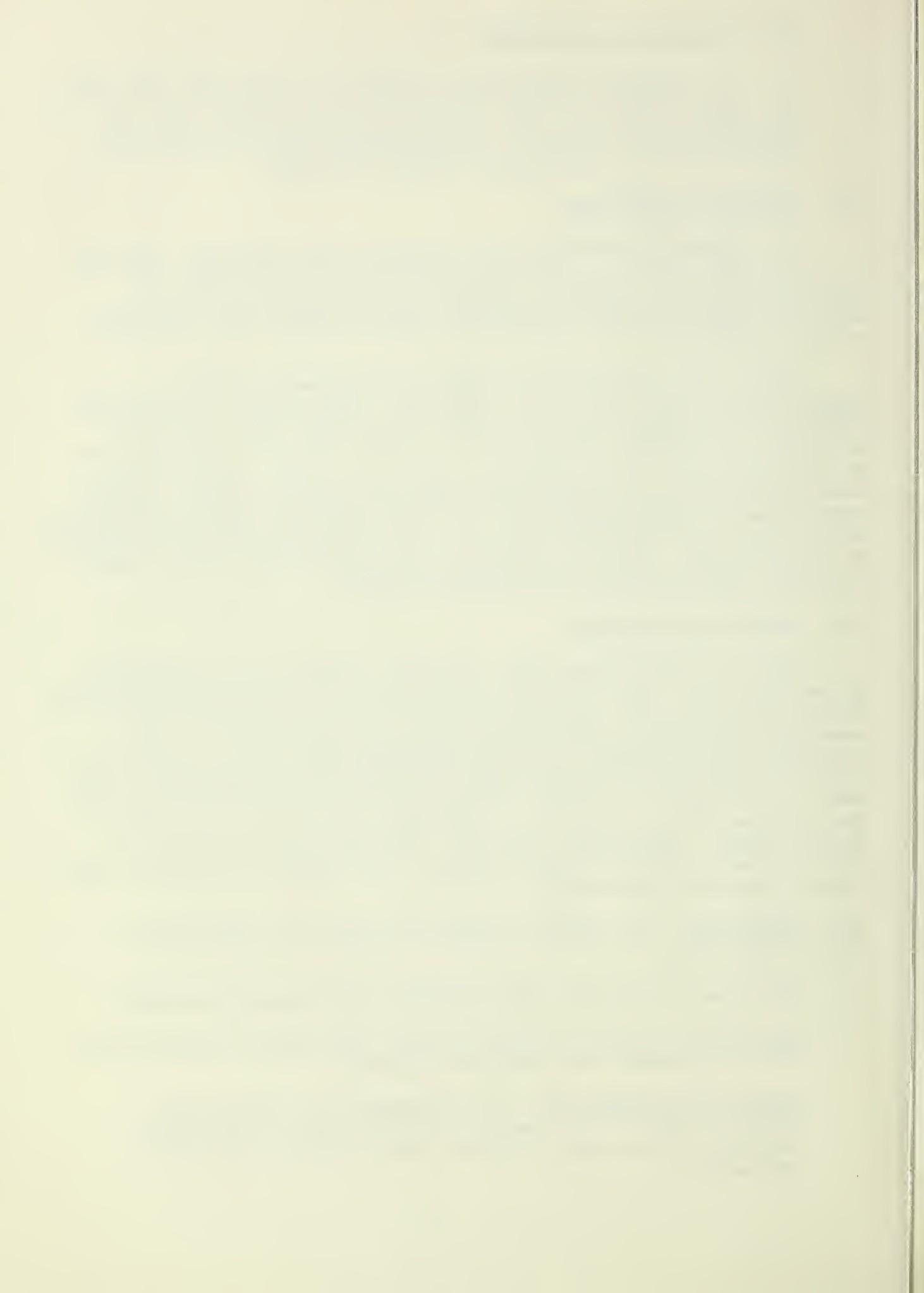
Title 18, United States Code, Sections 795 and 797, as implemented by Executive Order 10104, concerns restrictions on photographing classified military installations. The Contractor must meet Department of Defense security requirements before photographing any installation which is classified for the purpose of aerial photography when all or a portion of such an installation is located within the area to be photographed. This shall not prevent the securing of photography on other areas or units in the same item during the period in which facility security clearance is being arranged. Photographic materials resulting from photography of classified areas shall be stored, handled, and shipped in accordance with existing security regulations.

160. DEFINITIONS. (In addition to those in Clause 1 of Form 6300-38, General Provisions)

Area means one or more units having the same designating symbol.

Unit means a portion of National Forest lands and/or National Grasslands and private lands being photographed.

Original Photography means all photography as secured by the contractor prior to its inspection by the Contracting Officer, including any necessary reflights made at the discretion of the contractor.



Reflight Photography means photography that does not meet specifications and must be reflown to satisfy all requirements.

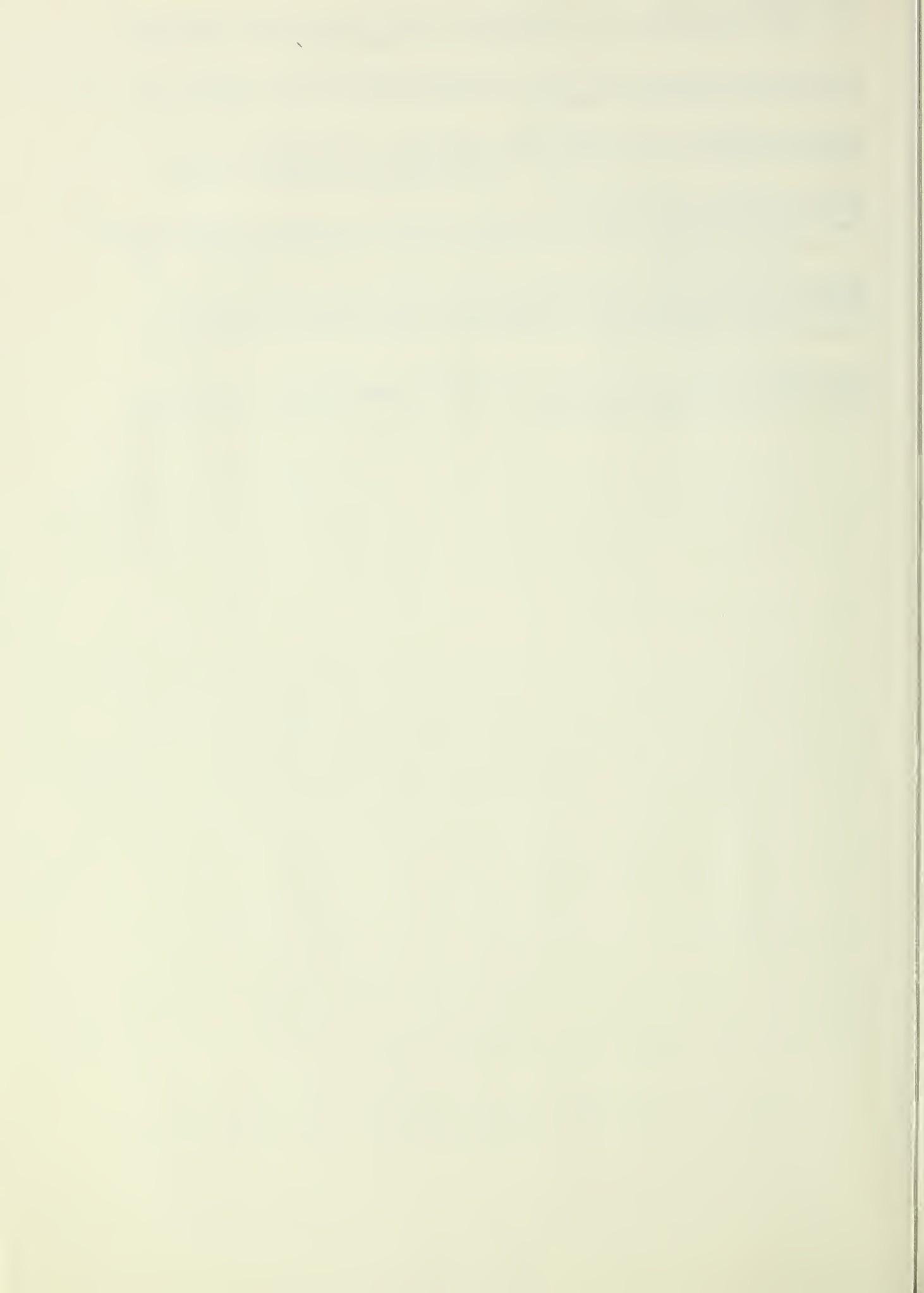
Photographic Mission means all photography secured on a single trip between one takeoff and landing.

Remake Materials means photo-index negatives, photo-index prints, or contact prints that do not meet specifications and must be remade.

Mapping Photography means photography obtained on color or panchromatic emulsion film with an 88, 153 or 210 mm focal length lens to be used for mapping purposes.

Resource Photography means medium scale photography obtained on either color, panchromatic or infrared emulsion film with 210 mm or 300 mm focal length lens.

Stereomodel means that area covered by the usable image area of the lens on two successive exposures.



DIVISION 200 - TECHNICAL SPECIFICATIONS

210. AERIAL MAPPING CAMERA REQUIREMENTS

Camera shall be of the precision aerial mapping type, having a single lens and a 23cm by 23cm (9" by 9") format.

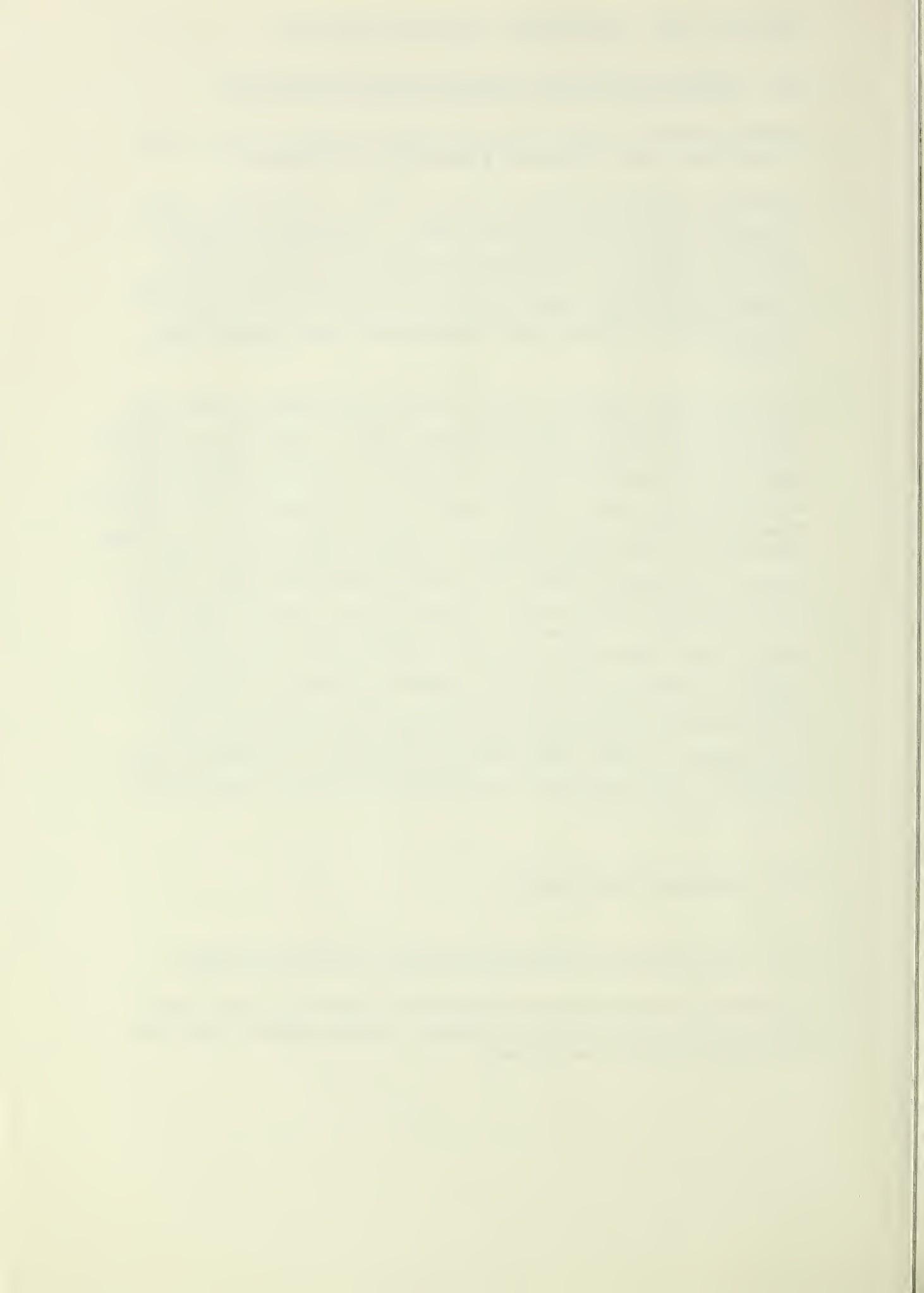
No camera shall be used to acquire aerial photography unless it complies with these specifications. Compliance shall be shown by a Report of Calibration prepared by the National Bureau of Standards. The report shall be based on tests and measurements made after final assembly or reassembly of all parts of the camera cone unit and with any required filter in place.

All tests of the camera, cone, and lens assembly to determine compliance with these specifications shall be made in accordance with the standard practice of the National Bureau of Standards. Each camera shall be in proper adjustment and operating condition throughout the entire period of its use on contract work. The Government may require the removal of a camera from use when deficiencies in the photographic materials attributable to the camera are found to exist. Any camera removed from use by the Government shall not be returned to use until the cause of the malfunction is corrected to the satisfaction of the Government, whose determination will be based on (1) additional acceptable samples and/or (2) an additional camera test, as outlined in the Bidder Qualifications. Each camera shall be provided with identifying markers which will reproduce the lens number and the calibrated focal length on or between each negative. The identifying marks shall not obscure any part of the fiducial markers.

211. Constructional Details

211.1 Constructional Details Necessary to Permit Testing

To permit the necessary testing for the Report of Calibration without errors due to film shrinkage, constructional details of the camera shall be as follows:



1. Photographic Plates. It shall be possible to insert a 24.1cm x 24.1cm x 0.64cm (9-1/2" x 9-1/2" x 0.25") glass photographic plate in the camera's focal plane. In those cases where this requirement is not met, the camera will be considered as meeting the requirement if the emulsion surface of the glass plate can be placed in the focal plane by being supported at four points mechanically set in the camera for that purpose prior to shipping the camera for the test.

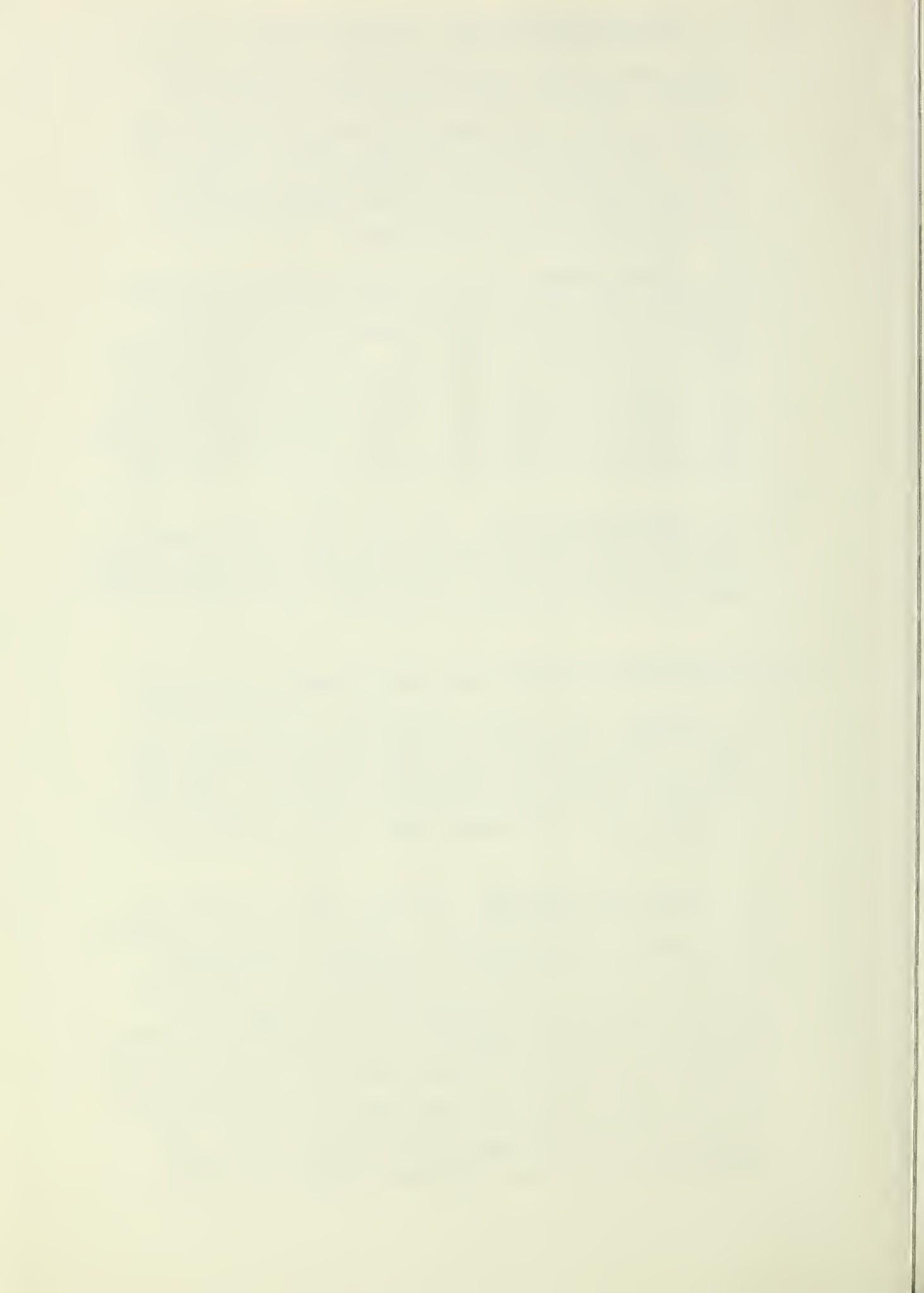
2. Focal Plane. The focal plane shall be accessible from the rear so that a telescope, placed behind the camera and directed along the axis of the lens, may view objects through the camera lens. The opening providing this unobstructed vision shall not be less than two inches in diameter and may be provided by removal of the platen. The removal of parts to secure this vision shall not include the removal of the fiducial markers or of the frame that determines the location of the focal plane.

3. Focal Plane Frame. The focal plane frame shall be such that when a glass photographic plate is pressed against the surface of the frame, the emulsion surface of the plate shall lie in the focal plane of the lens.

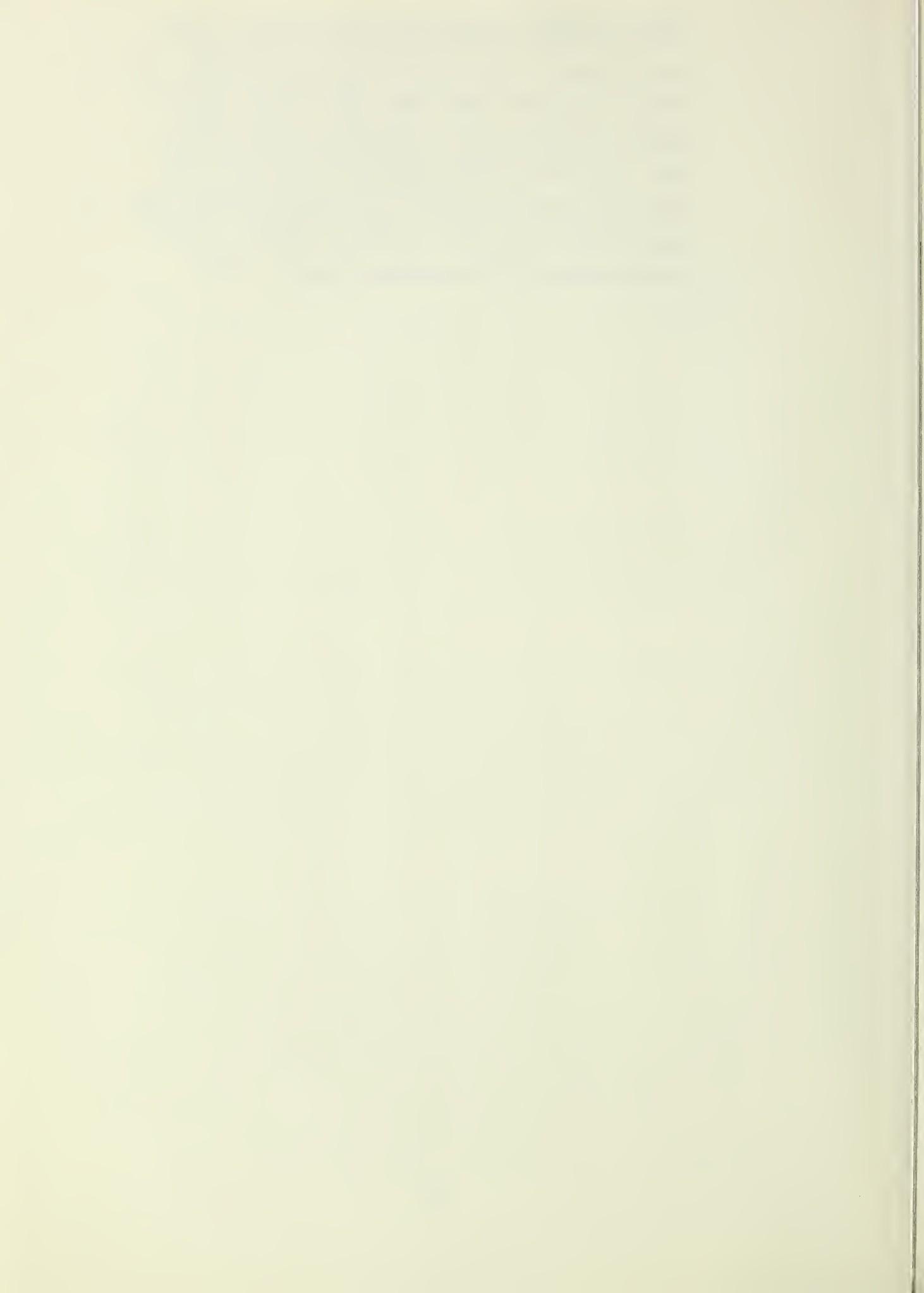
211.2 Constructional Details Required for Metrical Precision.

1. Platen. The surface of the platen against which the film is held during exposure shall not depart from a true plane by more than 13 micrometers (0.0005"). The only exception to this requirement shall be for a camera which is designed for, constructed with, and calibrated with a curved platen.

2. Lens Cone Assembly. The lens cone assembly shall be so constructed that the lens, fiducial markers, calibrated focal length marginal marker, and lens serial number marginal marker comprise an integral unit. The design of the lens cone shall be such that a fixed, rigid, and precise relationship is maintained between the lens-shutter assembly, the marginal markers and the focal plane on which the platen is positioned. These dimensional characteristics shall be retained without change under normal handling and use, including mechanical and temperature shock. The mechanical structure holding these components shall be supported in use in such a way that strains are not trans-



mitted from the supporting body or mount. Construction of the lens barrel shall be such that disassembly for cleaning the inner lens surfaces of the front and rear lens units shall result in no greater changes in the calibration constants than their probable errors as furnished in the test report. In case of disassembly for any cause, the lens cone assembly shall be such that all parts will return precisely to their original position. Major disassembly of the lens cone unit shall require recalibration prior to additional use.



212. CAMERA AND LENS

212.1 Optical Requirements

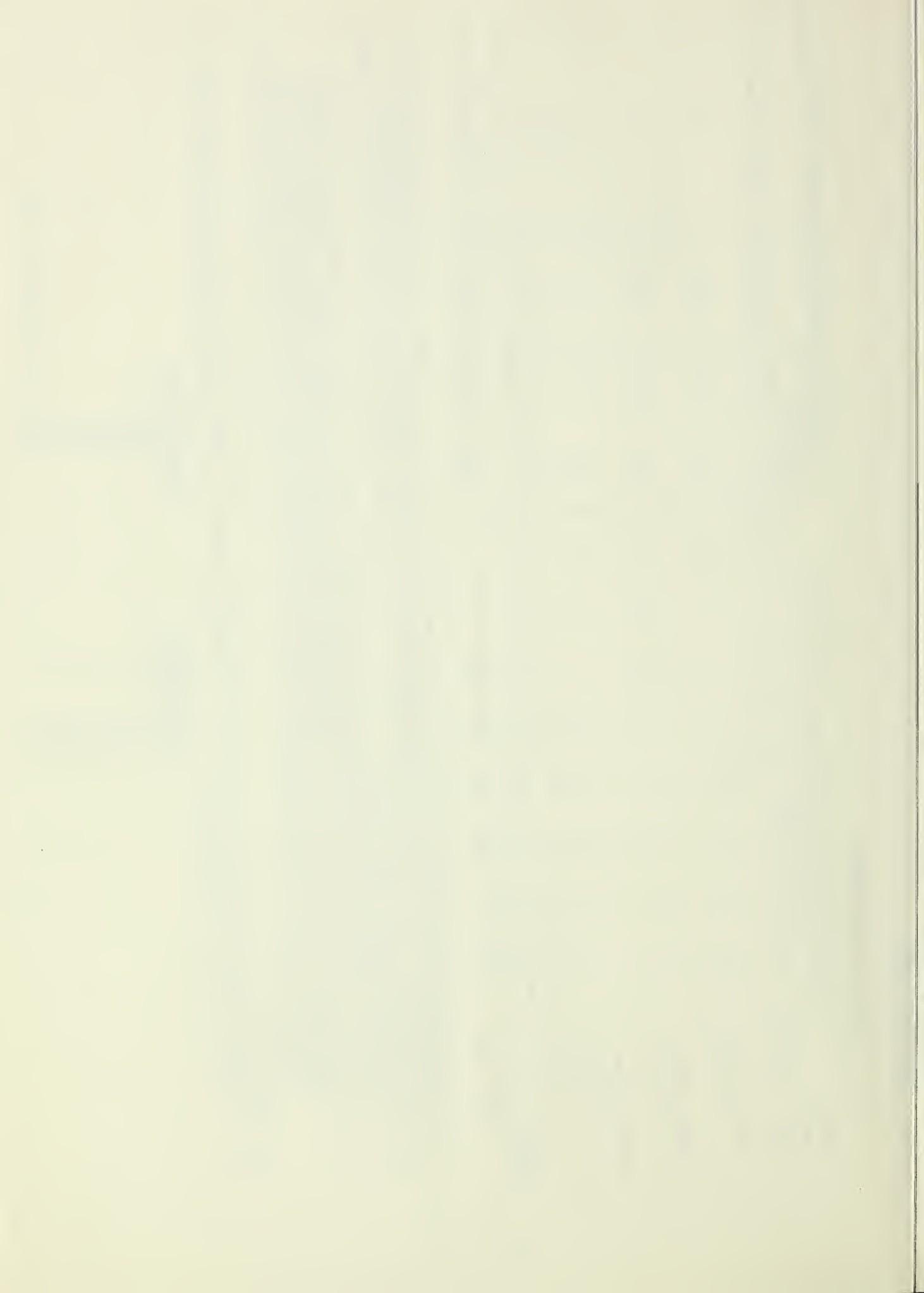
Nominal Focal Length Emulsion Minimum Acceptable Resolution (cycles/mm) 1/

Lens	Half Angle	0°	7½°	15°	22½°	30°	37½°	45°	52½°
88mm \pm 3mm A11 5/	50	50	50	35	20	15	12	10	40
153mm \pm 3mm A11 5/	45	45	35	35	30	14	--	10	50
210mm \pm 4mm Color 5/ Pan } TR }	45	45	38	35	34	--	--	20	--
300mm \pm 5mm A11 5/	45	45	30	30	20	--	--	30	--

Nominal Focal Length Emulsion	Lens Half Angle	Maximum Acceptable Distortion (micrometers)							
		0-30°	45°	Radial 1/	45°	Tangential	Radial Asymmetric 3/	45°	Radial 2/
88mm \pm 3mm A11 5/	50	10	40	55	10	40	55	10	40
153mm \pm 3mm A11 5/	45	20	10	50	10	50	10	10	20
210mm \pm 4mm Color 5/ Pan } TR }	45	12	20	--	20	--	12	--	24
300mm \pm 5mm A11 5/	45	30	30	--	30	--	15	--	40

- 1/ Using high contrast targets, fine grain emulsions and microflat glass plates. Resolution must equal or exceed these values along all four radii tested, and in both tangential and radial orientations.
- 2/ When referred to the calibrated focal length, radial distortion may not exceed these values at any point within the angular field listed.
- 3/ The values of radial distortion obtained at two equal but opposite angular separations from the axis along the same diameter shall not algebraically differ by more than this amount. (Example: Radial distortions at 15° along the same diagonal are +25 micrometers and -15 micrometers. These have an algebraic difference of 40 micrometers, which is the maximum permissible for 8½" camera, panchromatic emulsion.)
- 4/ Within 22½° of optical axis.
- 5/ No camera shall be used to acquire color photography unless its lens spectral transmission exceeds the following minimum requirements:

Wave Length	Transmission
400 nanometers	15%
450 "	50%
500 "	65%
600 "	70%
700 "	65%
800 "	60%
900 "	50%) Color infrared only.



212.2 Filter. No filter shall be used unless its surfaces are within 10 seconds of arc of being parallel.

All filters used shall be of such quality that no reduction of resolution will result from their use.

212.3 Fiducial Marks. Cameras will have at least four fiducial marks. These may be at the midpoint of the sides of the focal plane or they may be in the corners of the focal plane.

The lines joining opposite pairs of fiducial marks shall intersect at an angle within one minute of 90° . The intersection of these lines shall indicate the location of the principal point of auto-collimation within 0.03 mm.

When required by the Solicitation, four additional fiducial marks will be in the cameras focal plane, midway between the four primary fiducials (i.e., in the corners for those cameras with their primary fiducials along the side or at the midpoint of the side for those cameras with their primary fiducial in the corners). The additional fiducials will be aligned so that connecting lines of opposite fiducials shall intersect within 2 mm of the principal point of auto-collimation. The design of all fiducials shall be such that accurate comparator readings can be made on them.

212.4 Shutter. The camera shall be equipped with a between-the-lens shutter of the variable speed type. Tests shall be made at f/11 to determine total open time, efficiency, and effective exposure time of the shutter mounted in the camera. This test shall be made in accordance with "American Standard Method for Determining Performance Characteristics of Front Shutters Used in Still Cameras", approved June 29, 1959 by the American Standards Association (ASA, PH3.4-1959). Efficiency shall be not less than 75% at the fastest speed. All shutters shall be capable of exposures of 1/200 of a second or faster.

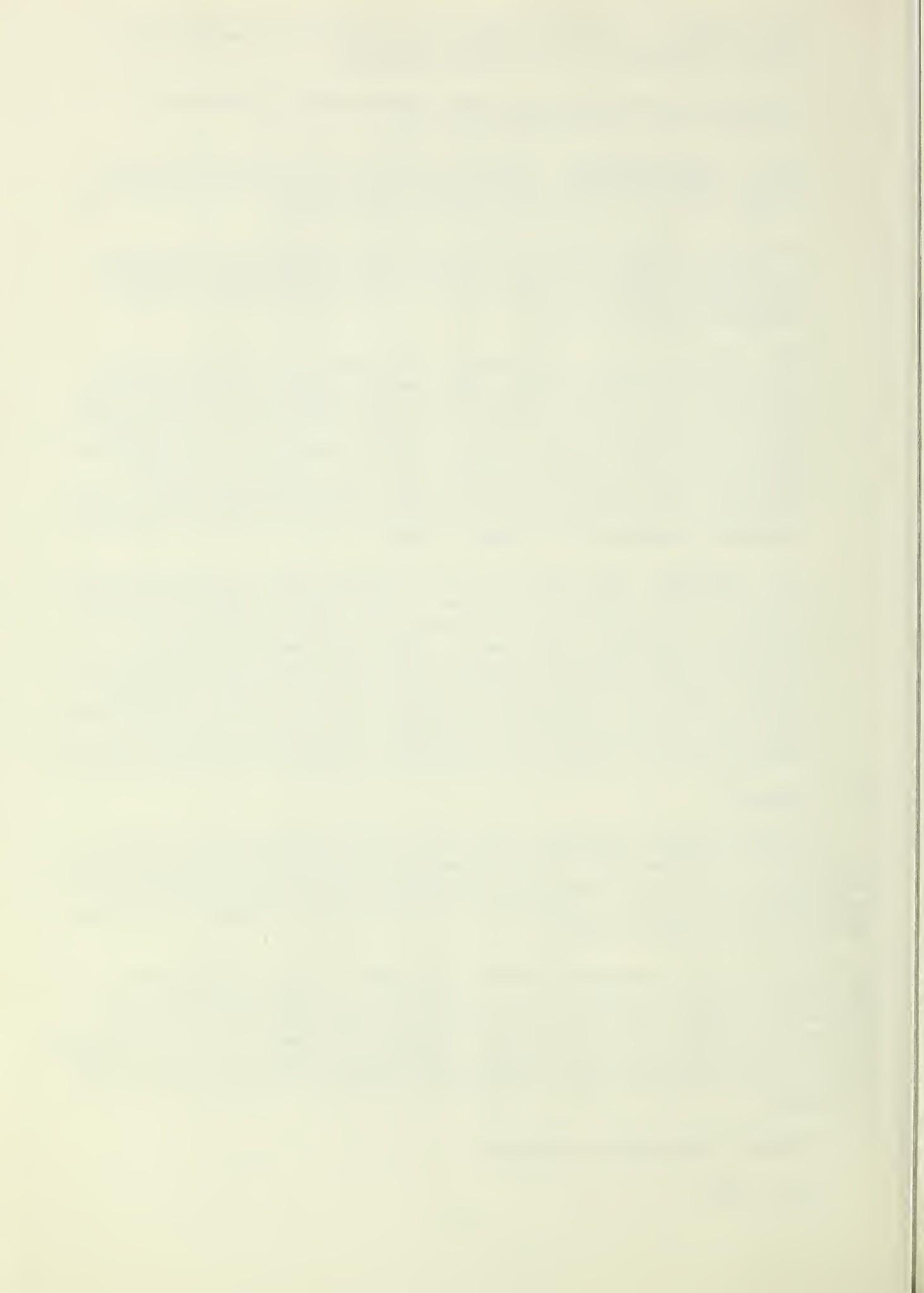
220. AIRCRAFT

The photographic aircraft to be used in the performance of contract work shall be equipped with all the essential navigational and photographic instruments and shall be capable of maintaining an altitude above ground level during photographic operations to yield aerial negatives at the scale specified in the Solicitation.

No window shall be interposed between the camera's lens or filter and the ground unless the flight line is planned for an altitude higher than 9144 meters (30,000 feet) above sea level, and the window is of optical quality glass with surfaces parallel to within 10 seconds of arc, of uniform spectral transmission through the 400-900 nanometer range, and free of any features which would decrease resolution or introduce distortion into the photographs.

230. APPROVED PHOTOGRAPHIC MATERIALS

231. Film.



231.1 Color Emulsion. Only fine grained, high speed, unexpired, color film shall be used. This film shall be sensitive to the entire visible spectrum (400-700 nanometers or 400-900 nanometers for color infrared). Color film may be either color-reversal type or color-negative type, as specified in the Solicitation. Color film (other than color IR) shall have a polyester base at least 0.102 mm (0.004") thick, and be 24.1 cm (9½") wide. The film shall have a sensitivity rating sufficient to insure exposing the negative to normal densities with the lens speed, shutter openings, and light conditions which can be expected to prevail in the contract area, and without such image motion as to render the photography unusable for its intended purposes.

231.2 Panchromatic Emulsion. Only fine-grained high-speed unexpired panchromatic emulsion polyester base aerial film shall be used. The film shall have an American Standards Association rating sufficient to produce normal densities and insure normal exposure at optimum lens opening under the available light conditions which can be expected to prevail in the area being photographed. The film shall be not less than 0.102 mm (.004 inch) in thickness and 24.1 cm (9½") in width.

231.3 Infrared Emulsion. Only a high-speed fine-grain unexpired infrared emulsion low shrink acetate safety base film shall be used.

231.4 Flash Plate. Only unexpired glass plates shall be used. Curvature and flatness tolerance shall not exceed 0.00002 inch per linear inch. Exposure and developing shall be such that accurate comparator readings may be made on all fiducial marks. Plates shall be 24.1 cm x 24.1 cm x 0.64 cm (9½" x 9½" x 0.25") in size.

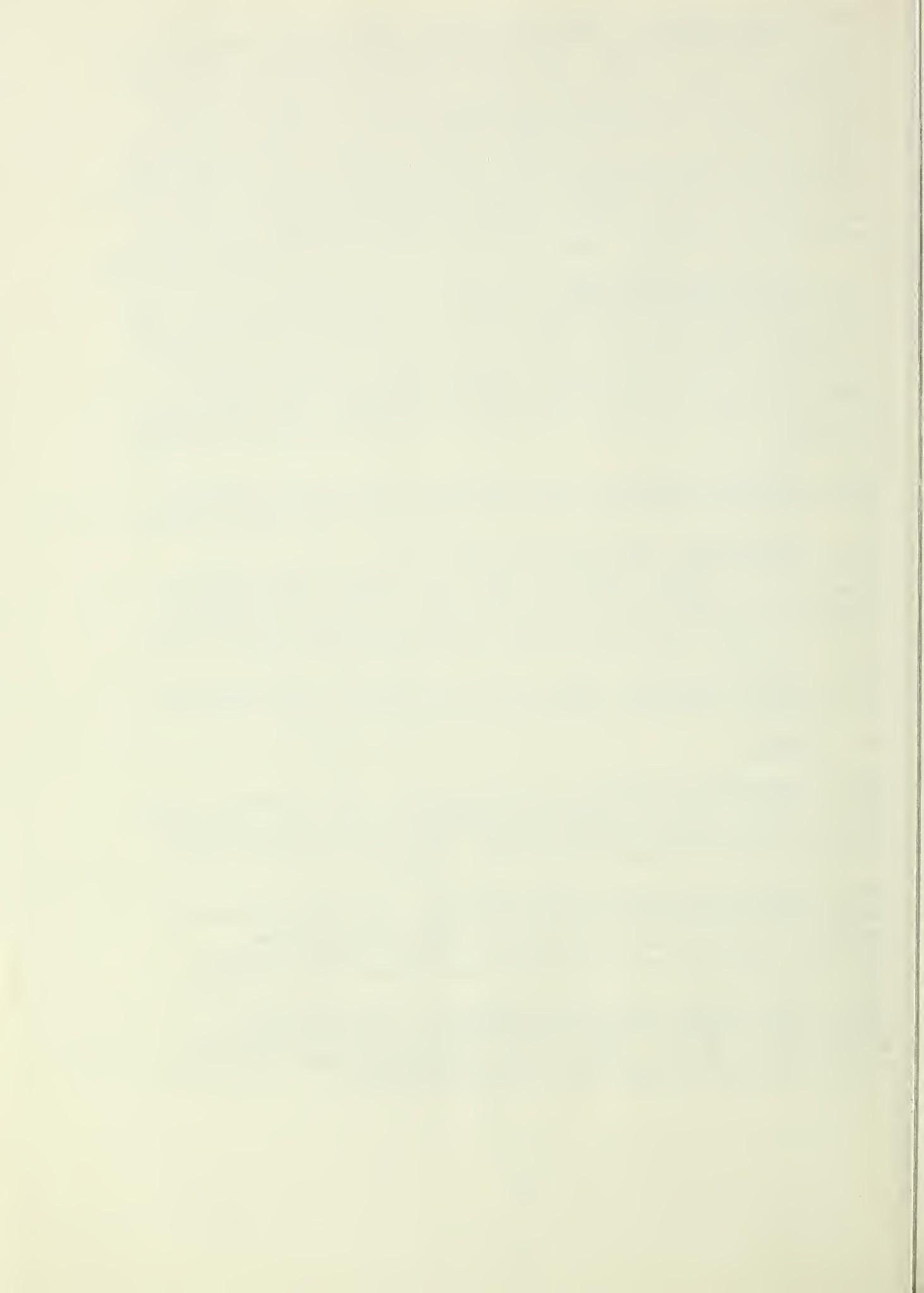
231.5 Photo-Index Film. Only 51 cm x 61 cm (20" x 24") unexpired, fine-grained, commercial safety base film shall be used.

232. PRINTS

232.1 Polyester Base Contact Print Material. All low-shrink contact prints required shall be printed on unexpired white opaque polyester base contact printing material having a thickness of not less than 0.178 mm (.007") and with a semi-matte surface.

232.2 Doubleweight Contact Print Material. All doubleweight semi-matte contact prints required shall be made without mask on unexpired standard commercial grade photographic paper having a fine grain emulsion satisfactory for good stereoscopic resolution.

232.3 Singleweight Contact Print Material. All singleweight contact prints shall be printed on unexpired standard, commercial grade, matte or glossy, singleweight photographic paper, ferrotyped or non-ferrotyped as specified in the Solicitation.



232.4 Photo-Index Print Material. All photo-index sheets required shall be printed on unexpired white opaque polyester base contact printing material as specified in paragraph 232.1

232.5 Contact Print Material - Water Resistant. All water-resistant contact prints required shall be made on unexpired standard commercial grade single-weight paper base material, impregnated with plastic for water resistance and strength. Emulsion surface shall be smooth, with white background.

232.6 Color Print Material. All color prints required shall be made on unexpired standard commercial grade multilayer color photographic paper capable of yielding sharp images and proper color balance. Prints shall be made only from materials which have been properly refrigerated while in storage.

240 COVERAGE REQUIREMENTS

241. Boundary Coverage

241.1 Resource Photography

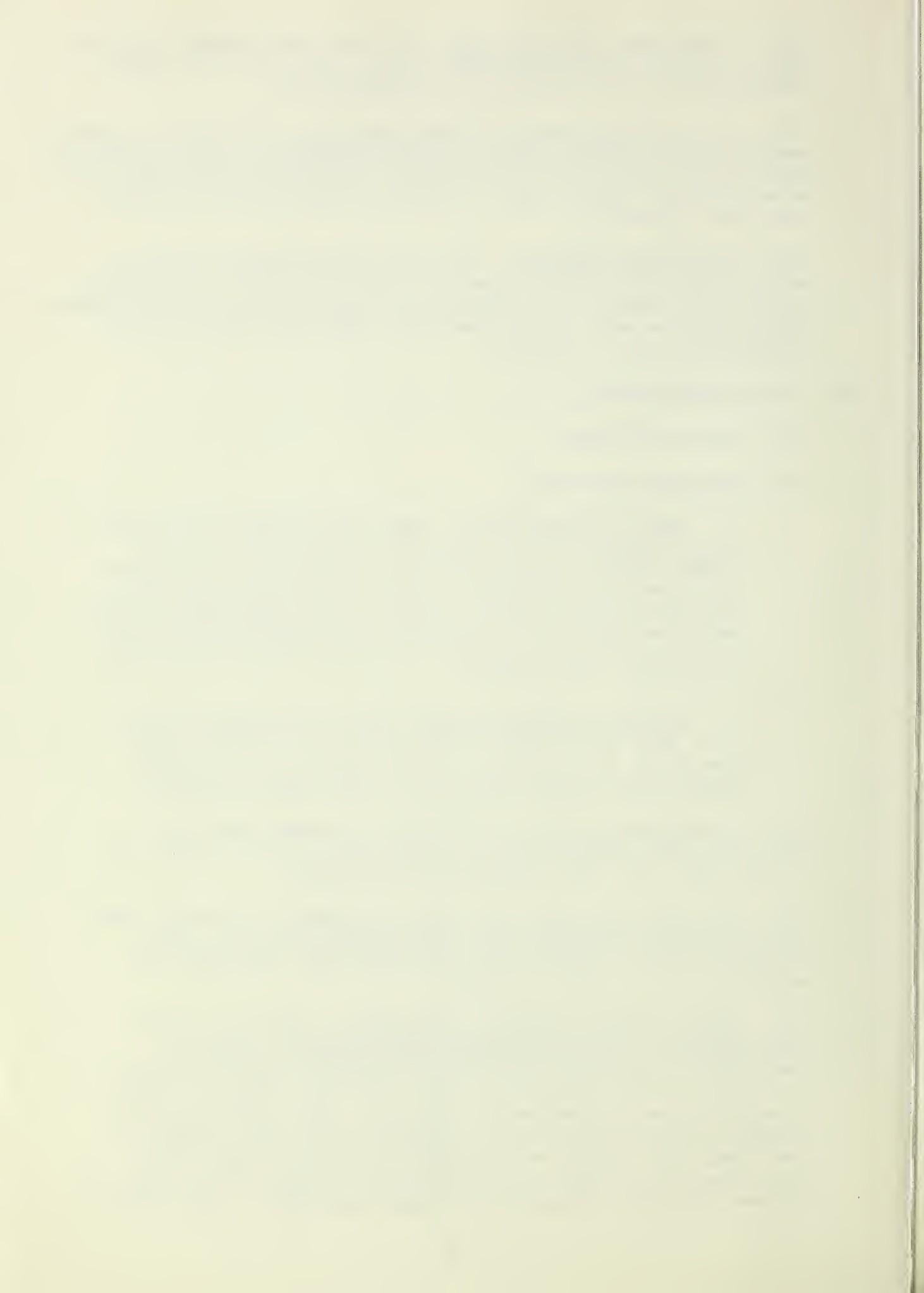
A. Ends of Flight Strips. Where the boundary of the area to be photographed is essentially perpendicular to the flight lines, the first and last photograph on each flight line shall fall entirely outside of the project boundary. When the boundary runs at an angle with flight lines, there shall be exposures at the end of each flight strip to provide stereoscopic coverage to a point at least one (1) mile outside of such boundary.

B. Parallel to Flight Strips. Where the boundary of the area to be photographed is parallel to the flight lines, the flight line position will be plotted so the sidelap beyond such boundary shall not be less than 25 percent.

241.2 Mapping Photography. Stereoscopic coverage shall be obtained to the terminal points of each flight line, as indicated on the flight line maps furnished the contractor.

242. Deviation from Specified Flight Altitudes. Deviations from specified flight altitudes shall not exceed 91.5 meters (300') in the Continental United States and Puerto Rico and shall not exceed 152 meters (500') in Alaska.

243. Ground Movement, Mapping Photography. Due to the rigid requirements for which this mapping photography is obtained (extension of control by first order stereoplottng instruments or by analytic photogrammetry), ground movement during the period of exposure shall not exceed two (2) feet. For measuring ground movement, ground targets will be placed by the Forest Service so their image will appear on photographs of various flight lines. Each target will consist of two (2) panels arranged in the shape of a cross. The total length of each panel expressed in feet will be



1/1,000th of the denominator of the representative fraction scale of the photography. The width of each panel shall be 1/5th of its length. The material for each panel will have sufficient contrast with the ground to insure negative contrast and visibility. When feasible, the panels will be placed with the ends pointing to the cardinal directions.

Ground movement will be measured on the negative with the aid of a variable power precision shop microscope with 10x - 40x magnification. The ground target may appear anywhere on the negative and any target falling within an 8.8" x 8.8" format will be checked. The targets as measured on the negative after delivery to the Forest Service shall have true size and shape within 0.001 inch. Failure to meet this tolerance may cause rejection of all negatives of the flight strip or roll.

244. Flight Strip.

A flight strip shall be the photographs resulting from flying the full course of a flight line across a unit or area. Position and spacing of all flight strips shall conform within allowable deviation to the lines as plotted on the flight line maps.

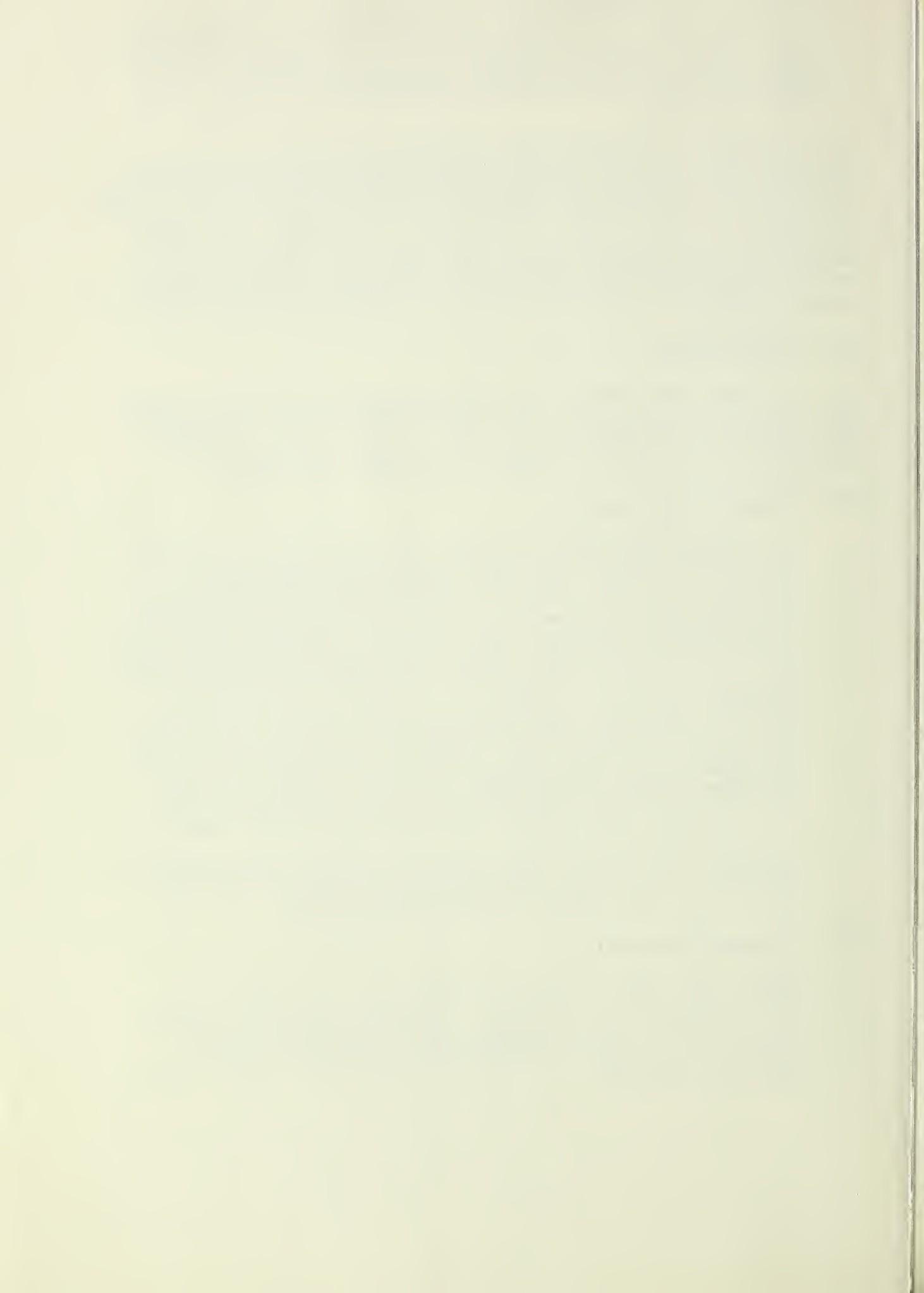
244.1 Resource Photography.

A. Flight lines shall be flown in the direction and location shown on the flight line maps furnished the contractor. Horizontal deviation from the plotted position of the flight line in excess of 12 percent of the flight altitude above the assumed ground datum may cause rejection. Deviations resulting in less than the minimum sidelap requirements (paragraph 245) may cause rejection. Segments of a flight line requiring reflights due to the contractor's failure to meet the requirements for position, scale, sidelap, etc., may be limited to one segment per flight line, subject to the discretion of the Government. If it is necessary to break a flight line when obtaining original photography, the flight strip resulting from the break shall consist of no fewer than eight exposures.

B. Where breaks in a flight strip for resource photography are necessary, the minimum endlap between segments of the strip shall be not less than one hundred (100) percent.

244.2 Mapping Photography.

Flight lines shall be flown as indicated on the flight line maps furnished the contractor. Horizontal deviation from the plotted position of the flight lines in excess of six (6) percent of the flight altitude above the assumed ground datum may cause rejection.



Each flight line shall be a continuous unbroken flight across a unit unless otherwise authorized by the Contracting Officer. Any unscheduled break in flight will require a reflight of the entire strip.

244.3 Reflight Photography. Reflights for resource photography shall be centered over the plotted flight line position and shall consist of no less than eight (8) exposures. Reflights for mapping photography shall be centered over the plotted flight line position and shall be continuous throughout the entire flight line.

244.4 Gap Flight Strips. Should the contractor furnish photography meeting the requirements of these specifications pertaining to flight line position and flight altitude within the allowable deviation from position and altitude contained herein and should insufficient sidelap occur, the contractor will photograph the necessary gap strip. Mapping photography gap strips shall extend the full length of the adjacent flight lines and shall consist of a minimum of eight (8) exposures. Resource photo gap strips shall consist of at least eight (8) exposures centered on the point of minimum sidelap. The length and position of the gap flight strip required to insure satisfactory coverage of the area of inadequate sidelap will be as specified by the Contracting Officer.

245 Overlap

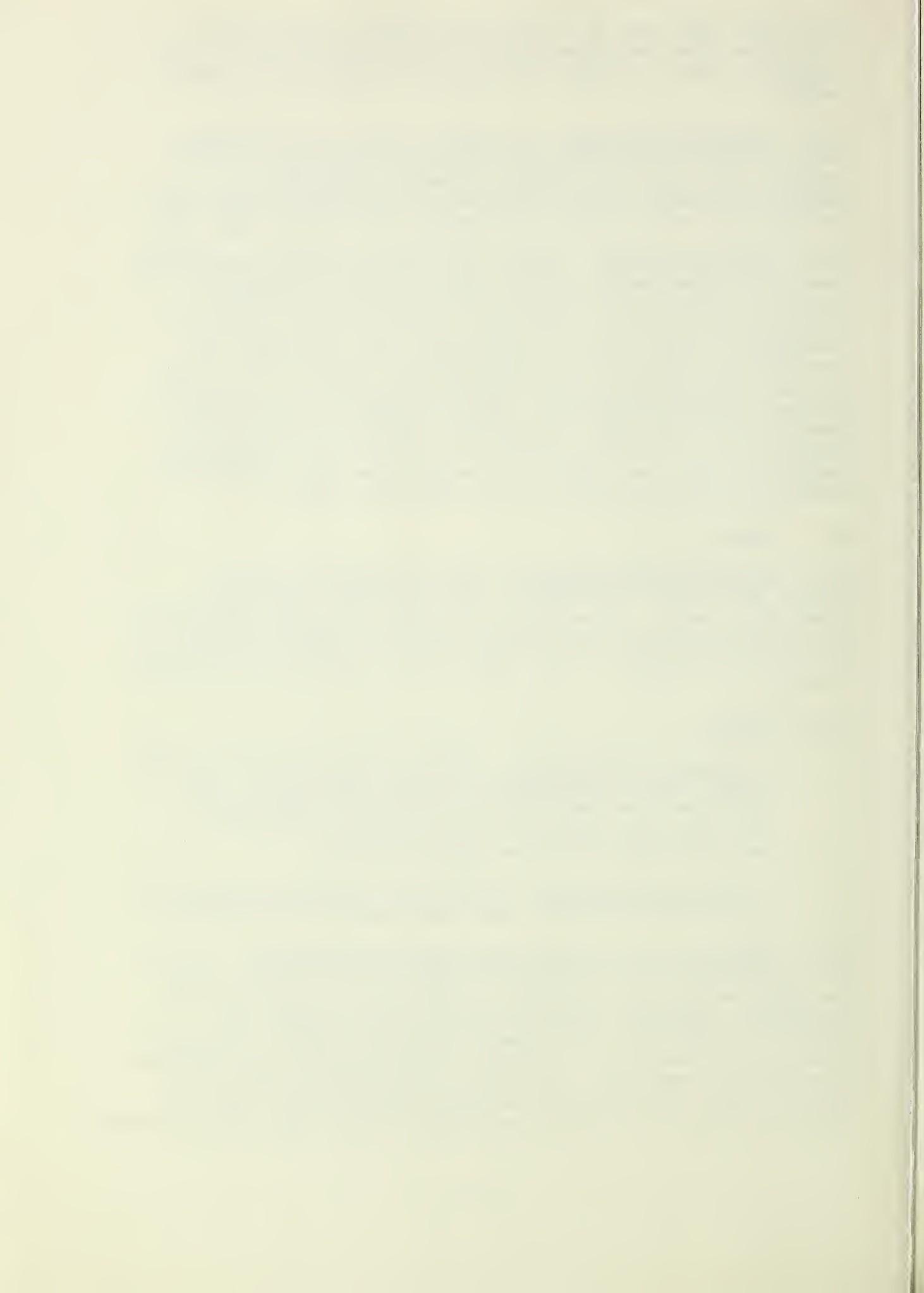
245.1 Endlap in Line of Flight. Endlap (overlap in line of flight) for resource and mapping photography shall approximate sixty (60) percent. Any endlap of less than fifty-five (55) percent or more than sixty-five (65) percent may cause rejection of any, or all, of the photographs in the flight strip in which such deficiency occurs.

245.2 Sidelap

A. Resource Photography. Sidelap between adjacent parallel flights shall be approximately thirty (30) percent. Any sidelap of less than fifteen (15) percent or more than forty-five (45) percent may cause rejection of any or all of the photographs within the flights involved.

B. Mapping Photography. Sidelap for mapping photography will depend on the altitude, scale, and position of flight lines.

245.3 Deviations Due to Elevations, Resource Photography. In cases of extreme variations in elevation within an area, deviation from the requirements may be permitted, provided, in the opinion of the Government, topographic features within the area warrant such deviation. Under such circumstances deviations from the specifications will be limited to the amount actually caused by the variation in elevation, except that any endlap of less than fifty-five (55) percent and/or any sidelap of less than ten (10) percent may cause rejection of any or all of the photographs in the flight strips involved.



246. Crab

246.1 Resource Photography. Any series of two or more consecutive photographs crabbed in excess of ten (10) degrees as measured from the plotted flight line may cause rejection of that particular flight strip of negatives or portion thereof in which the crab occurs.

246.2 Mapping Photography. Any series of two or more consecutive photographs crabbed in excess of five (5) degrees as measured from the plotted flight line may cause rejection of that particular flight strip of negatives.

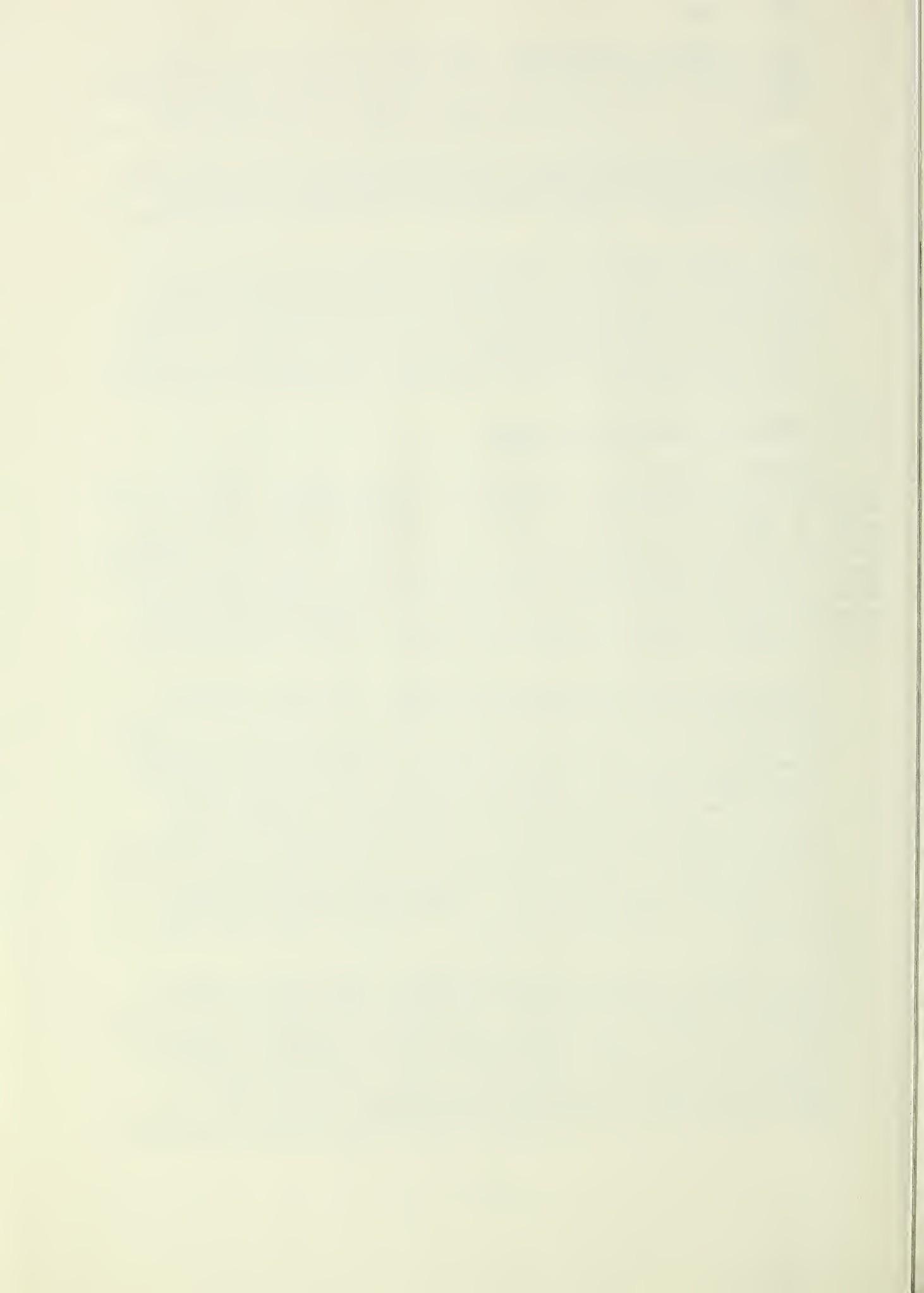
247. Tilt. Negatives made with the optical axis of the camera in a vertical position are desired and tilt (departure from the vertical) of any negative exceeding four (4) degrees or averaging more than two (2) degrees in any six (6) miles section of a flight strip or more than one (1) degree for the entire unit, or relative tilt between any two successive negatives exceeding six (6) degrees may cause rejection.

250. QUALITY OF NEGATIVES AND PRINTS

Storage, exposing and processing of all photographic materials shall be done in conformance with manufacturer's recommendations, and with accepted photographic practice. Negatives and prints shall be clear and sharp in detail and of normal density and fine grained quality. Negatives and prints shall be free from streaks, static marks, clouds, cloud shadows, ground fog, smoke, haze, snow, excessive shadows and other deficiencies which would interfere with their intended use. Delivered prints and/or negatives shall be equal to or superior to those samples submitted by the firm or company to qualify itself as a bidder.

251. Storage and Handling of Color Film. All stored unexposed color film shall be refrigerated at temperatures below 50° F. Color film need not be stored in a freezer, but if so stored, it shall be brought to room temperature slowly, for a period of 24 hours before breaking the seal of the can and exposing. The seal shall not be broken until necessary. Unsealed film shall not be returned to freezer, but shall be stored in a refrigerator. Unexposed film shall not be kept unrefrigerated in excess of one day. Exposed film shall be forwarded by air transportation to the processing laboratory within 24 hours. The film shall be forwarded in the original can and cap showing the emulsion number. Flight data (altitude, shutter speed, lens opening, time of day and atmosphere conditions) shall be furnished the processing laboratory.

252. Negative Density - Black and White. Negatives of medium or normal density requiring moderate printing time, without sacrificing detail or contrast, are needed. The degree of contrast shall be such that all possible detail shows clearly in the shadow and highlight areas as well as in the intermediate areas. Negatives will be subject to transmission densitometer readings to assist in determining their acceptability with respect to density and contrast when overly thin or dense negatives are delivered by the contractor.

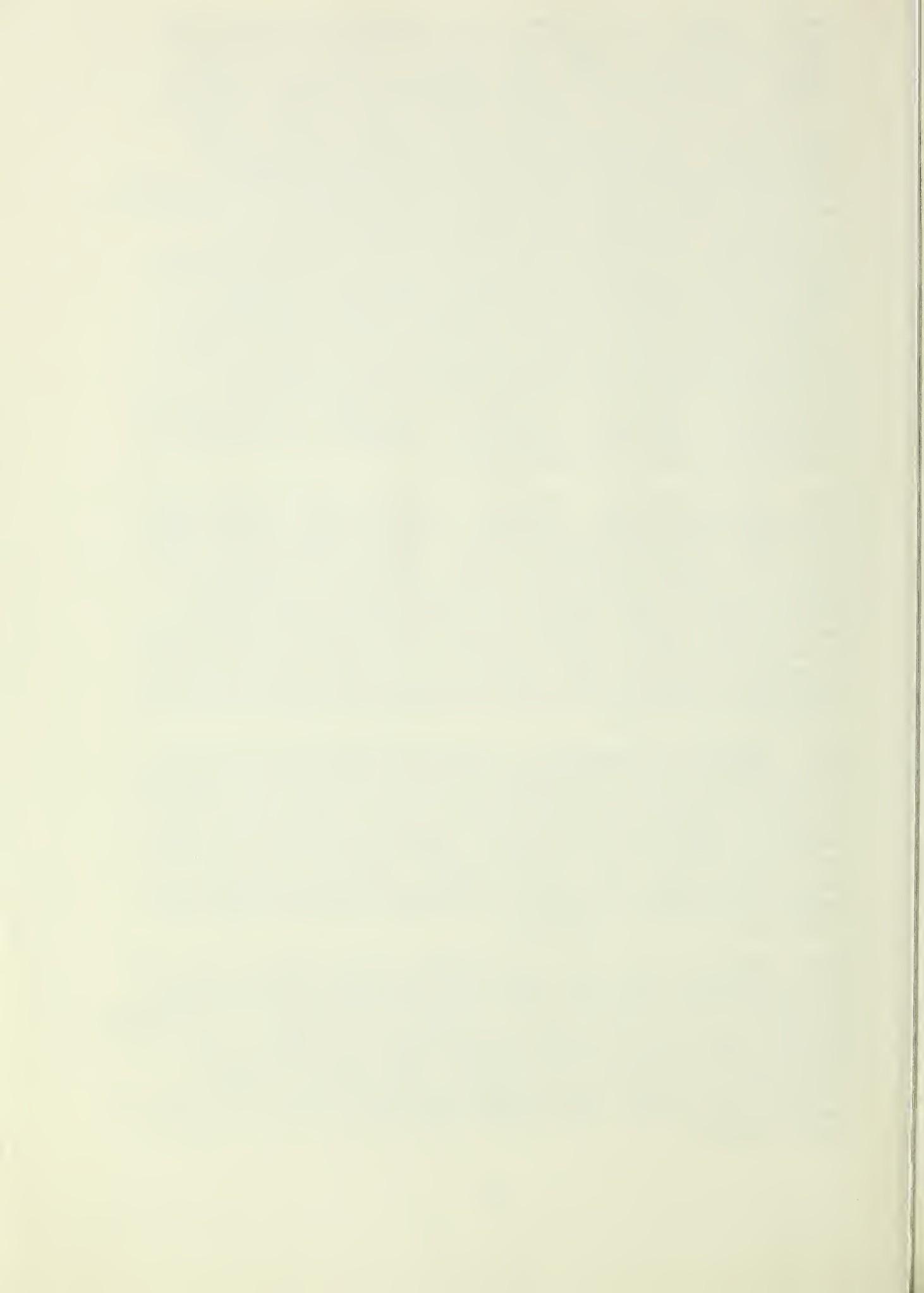


Density readings will be taken of the thinnest portion and of the densest portion of the negative using a transmission densitometer. Final readings will be made after receipt of film by the Forest Service. The difference in such densitometer readings (contrast) between the lightest and darkest portions of the negative shall not be less than 0.50 nor more than 1.25. No densitometer reading shall be less than 0.25 nor more than 1.50 after deducting the densitometer reading for the unexposed area between negatives which is defined as fog. This fog shall not exceed 0.20 for polyester base film. Where heavily forested areas having few or no rural or open areas furnishing "high lights" on the negatives are photographed, the readings will be made of the maximum and minimum density timber areas shown on no less than six (6) negatives. These will be averaged and the contrast difference resulting therefrom shall not be less than .30 with the above specified minimum reading of .25. Proper allowance will be made for areas of low contrast and the density range requirement may be waived if, in the opinion of the Forest Service, the contractor has exercised reasonable care to assure that the negatives meet density requirements. Reducing or intensifying of negatives will not be permitted, and the Forest Service shall chemically and/or physically test such negatives as deemed necessary.

253. Physical Quality. Photographic materials will be free from chemicals, stains, tears, scratches, and water marks, finger marks, lint, dirt, and other physical defects. Before, during, and after drying, the negatives and prints shall not be rolled tightly on drums or in any way stretched, buckled, distorted, or exposed to excessive heat. After fixation, all negatives and prints shall be thoroughly washed to insure freedom from residual hypo and other chemicals which might impair permanency. Excessive moisture should be removed immediately after washing. All prints (except polyester base) shall be immersed in a print flattening solution between print washing and air drying.

254. Dimensional Stability. To insure the dimensional stability of polyester base film and contact prints, it is essential that heat not be used in drying these materials. The film and prints should be dried by natural means in a dust-free area. Polyester base prints should be sponged off and air-dried. Heated belt type dryers shall not be used to dry polyester base prints. Evidence of the use of heat in drying this film, such as buckling, warping, cracking of the backing or shrinkage in excess of the amounts specified below shall cause rejection of the materials.

254.1 Polyester Base Film. The shrinkage of the polyester base film in any direction thirty (30) days after developing and drying shall not exceed five (5) parts per ten thousand (10,000) with a differential shrinkage between measurements in any two (2) directions not exceeding five (5) parts per ten thousand (10,000) when the film has been conditioned in an atmosphere of seventy (70) degrees fahrenheit (70° F.) plus or minus two (2) degrees and fifty percent (50%) relative humidity plus or minus three percent (3%) for a period of at least seven (7) days.



254.2 Polyester Base Contact Prints. The difference in length and width measurements between individual polyester base contact prints and corresponding polyester base roll negatives shall not exceed five (5) parts per ten thousand (10,000), and differential between length and width measurements on individual polyester base contact prints shall not exceed five (5) parts per ten thousand (10,000), exclusive of any differences between measurements taken after the prints and film have been conditioned in an atmosphere identical with respect to temperature and humidity conditions described above.

255. Processing Color Film. If wind-rewind processors are to be used for the developing of color film there shall be five unused or unexposed frames left at each end of each roll of color film to minimize "banding." Presence of any bands may cause rejection of the flight strip. Extreme care shall be exercised in exposing and processing color and color infrared films to minimize vignetting due to differential exposure over the 23cm x 23cm (9-inch x 9-inch) format. This differential shall not exceed that which would result from a basic $\frac{1}{4}$ stop difference in exposure.

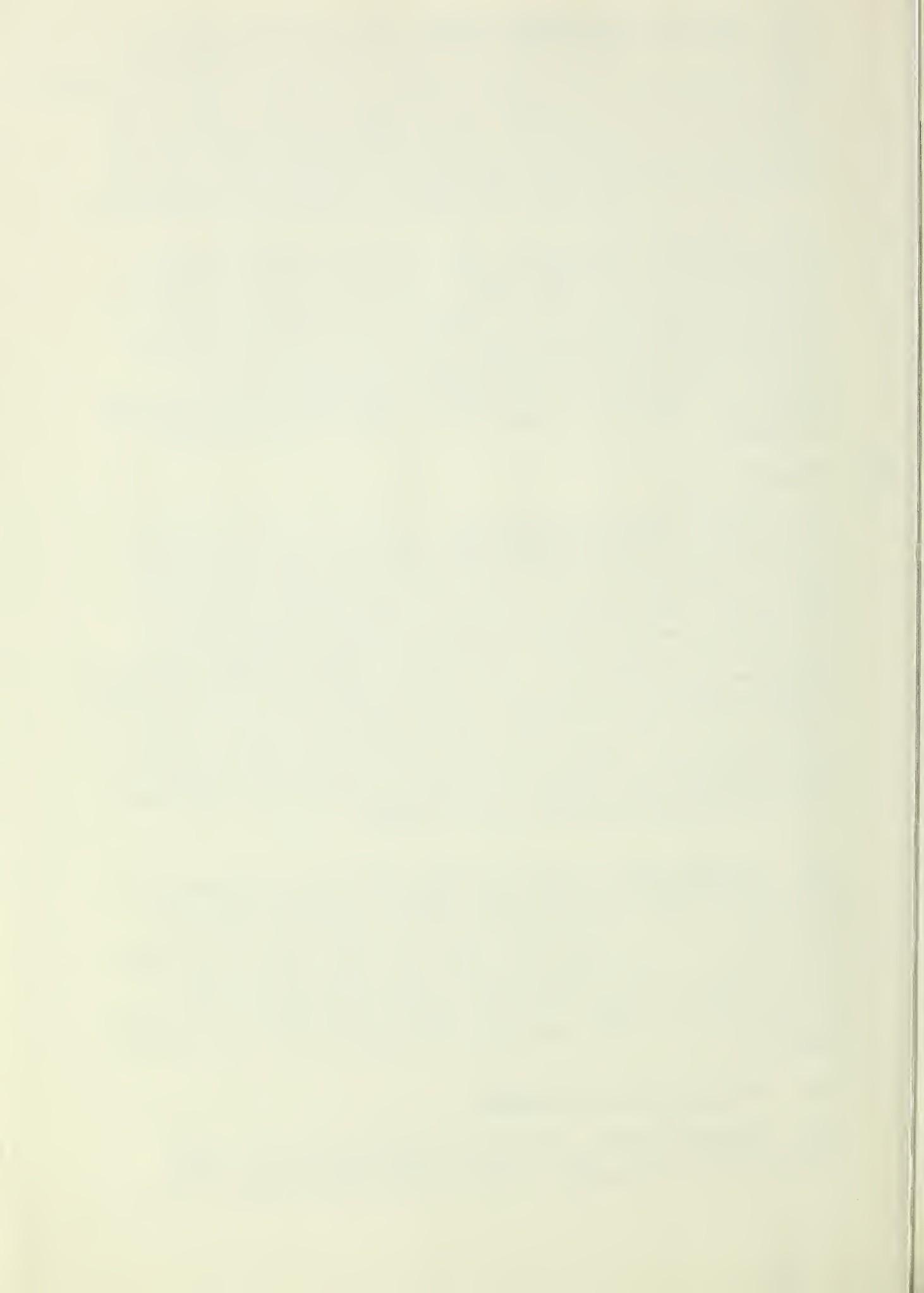
260. NEGATIVE ROLLS

261. Composition of Negative Roll. A roll of aerial negatives shall consist only of exposures made with the same camera (lens-cone combination) having the same distances between collimation marks. A roll may consist of negatives from portions of several film rolls. The composite shall be accomplished by properly splicing the several portions together to form a single roll as specified in paragraph 262. Film spools having a flange diameter of approximately 13.3cm (5 $\frac{1}{4}$ inches) shall be used, and only that length of film which can be wound on a spool without strain, leaving at least 3mm ($\frac{1}{8}$ inch) of flange exposed shall be placed on each spool. Sixty-nine cm (27 inches) of blank or unused film shall be left beyond the first and last used negative on each roll or segment to serve as leader and trailer. All film on any one roll shall have the same designating symbol and roll number.

262. Splicing Film. Splicing of film shall be accomplished with three-quarter (3/4) inch pressure sensitive polyester base tape. The splices shall be of the butt joint type with tape placed on both sides of the splice. Particular care shall be given to alignment of the film when splicing, with care being taken to trim all excess bonding tape in order that the film will be perfectly straight after splicing. A splice within a roll shall, in no case, be closer than nine (9) inches from the image edge of any accepted negative.

263. Editing of Aerial Negatives

263.1 Required Editing. Each aerial negative shall be marked clearly with the date, and the three-letter designating symbol furnished by the Government followed by the serial number of the



roll and the serial number of the exposure on the roll. The exposures on each roll shall be numbered in an unbroken series beginning with number one. The designating symbol, roll and serial numbers shall be placed in the northeast corner of each negative for north and south flights, and in the northwest corner of each negative for east and west flights. For flights in non-cardinal directions, the symbol and numbers shall be placed in the upper right-hand corner of each negative, progressing along the line of flight. The abbreviation of the date shall in each case be placed in the adjacent corner in a counter clockwise direction.

On the first and last negative of each flight strip and at each break in a flight line, the initials of the Forest Service (F.S.) and the approximate scale of the negatives shall be placed immediately preceding the designating symbol and the serial numbers. The abbreviation of the standard civil time of day of the exposure shall be placed immediately following the date.

(See fig. 263.11)

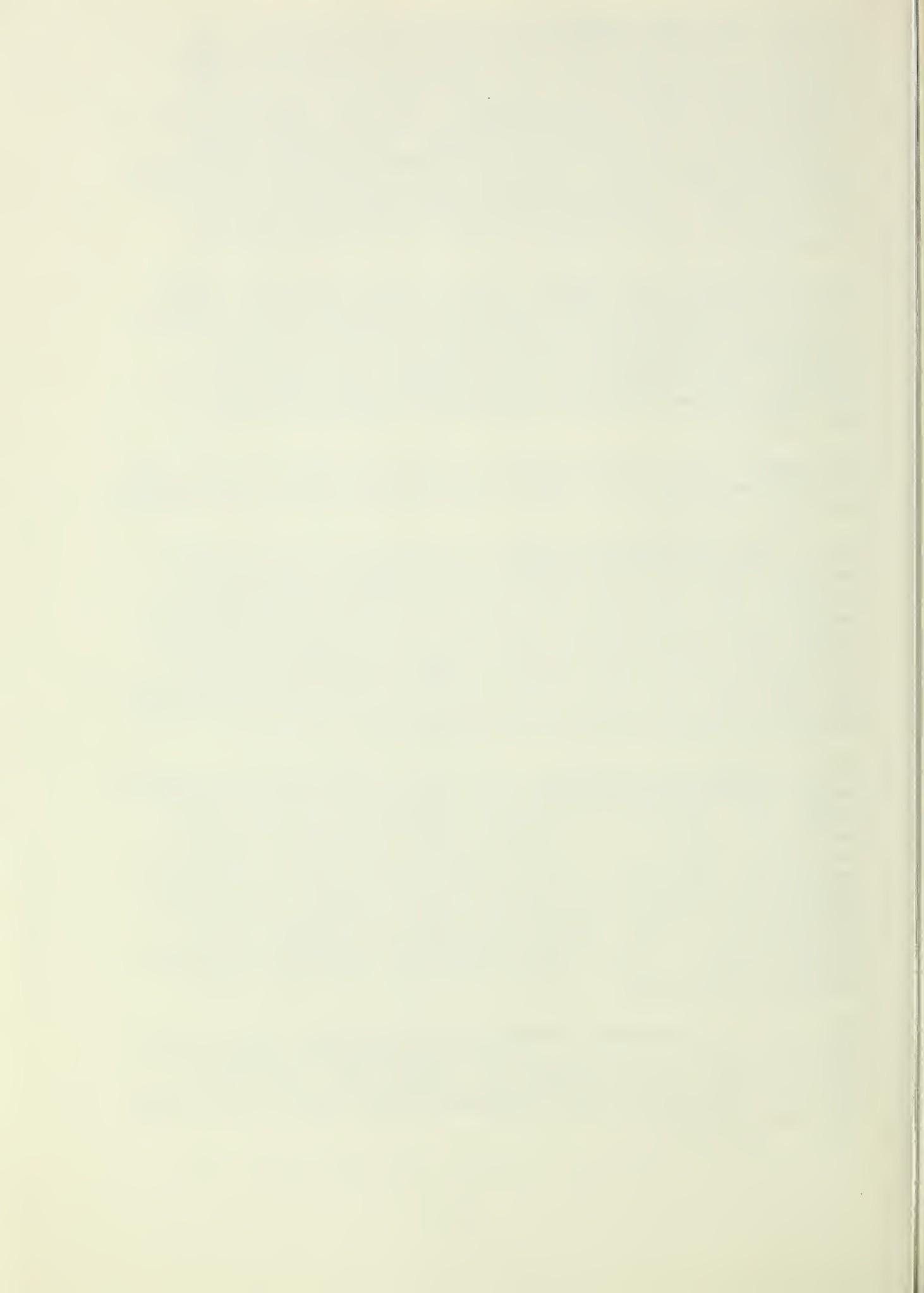
The numbers shall be positioned so each group will not be less than $1/16"$ or more than $3/16"$ from the related image edge of the negative.

(See fig. 263.12)

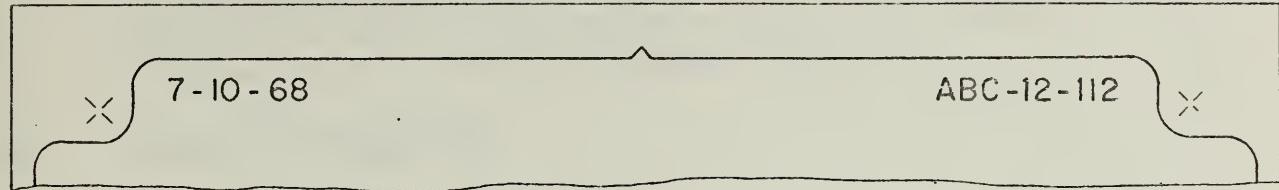
263.2 Type and Size of Lettering. The letters used in marking negatives shall be of the Gothic type and shall be from $0.15"$ to $0.20"$ high. They shall be sharp and uniformly applied on all negatives. The lettering shall be placed on the non-emulsion side of the negatives and may be applied by use of a mechanical stamp with opaque ink or neatly drafted. Their application shall be such that they will print clearly in positive form on the image of the photograph. No smears or transfers of the marking ink to other parts of the negative roll will be permitted.

263.3 Assigning Roll Numbers. The rolls of film used in the photography of each area shall be numbered consecutively beginning with number one. Rolls will be numbered consecutively for all rolls bearing that symbol. In no instance will the same roll number be assigned to more than one roll bearing the same symbol for accepted photography. Rolls of film used in the photography of reflights ordered by the Forest Service shall also be numbered consecutively starting with the next highest roll number as assigned to the original rolls. Such roll numbers shall not duplicate roll numbers already assigned. Entire rolls of rejected film shall not be assigned roll numbers.

When the U. S. Department of Agriculture Coordinator approves the reuse of a symbol assigned to earlier photography of the same area, the roll number will be suffixed by a letter, thus ABC-12A-112. The first rephotography will be denoted by the suffix A, the second by B, and so forth.



Sample Editing - intermediate photo



Sample Editing - terminal photo

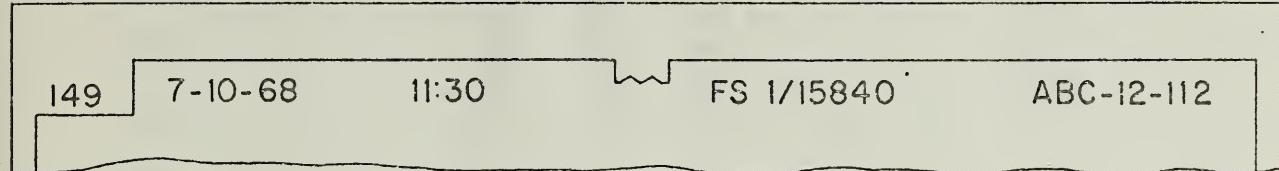
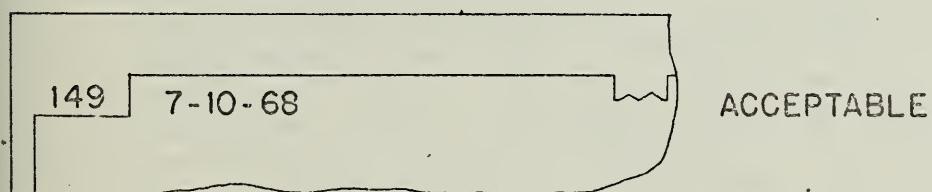
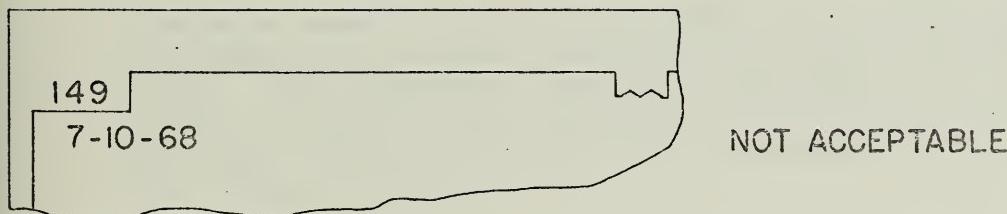
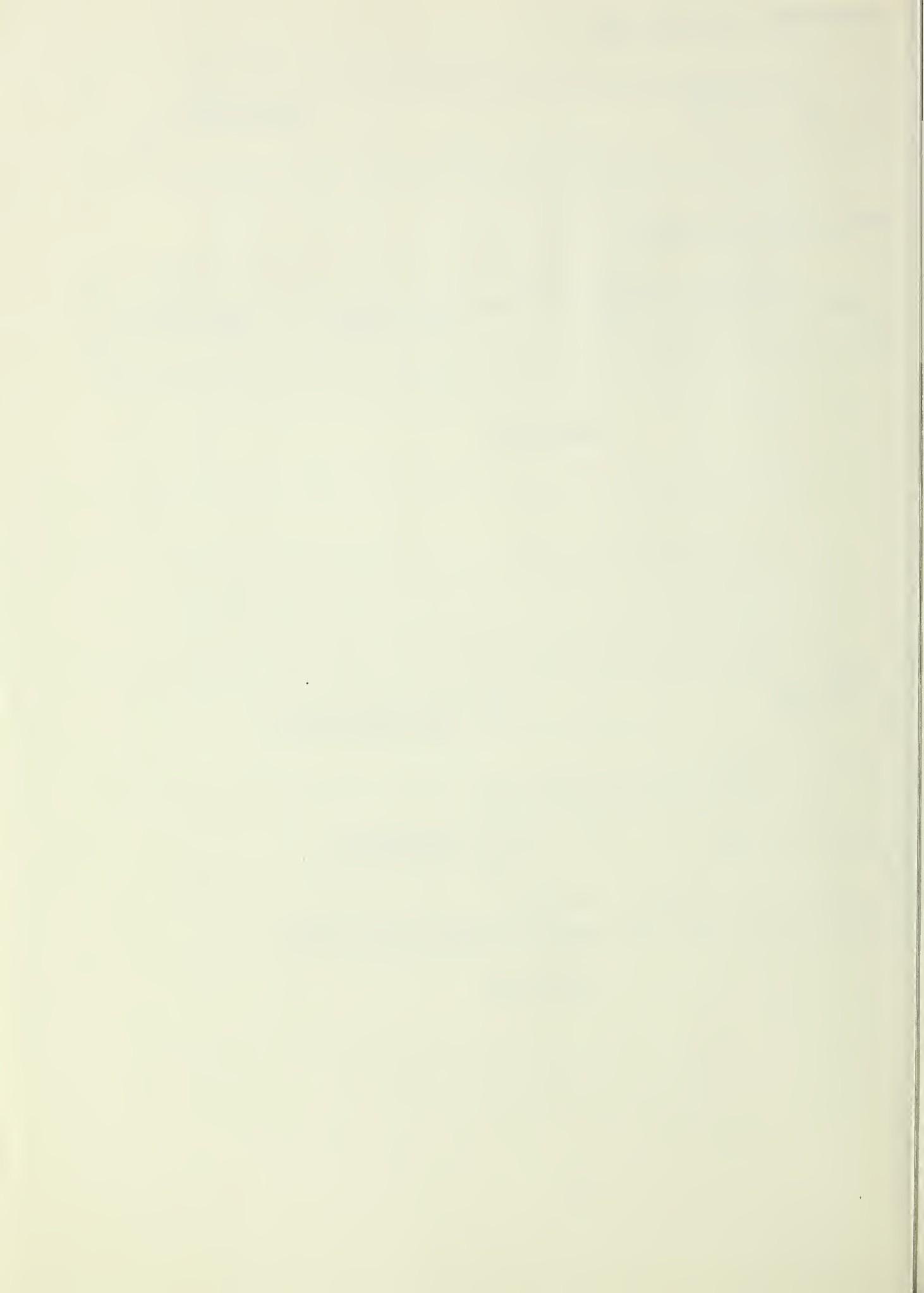


FIGURE 263.II



Editing to be 0.15" to 0.20" high, spaced 1/16" to 3/16" from edge of photo.

FIGURE 263.II



263.4 Rejected or Not used Negatives. Negatives not used or those rejected by the Contractor or the Forest Service need not be numbered and need not be stamped rejected. If numbered, rejected, or unused negatives shall be stamped "rejected."

INDICES TO PHOTOGRAPHY

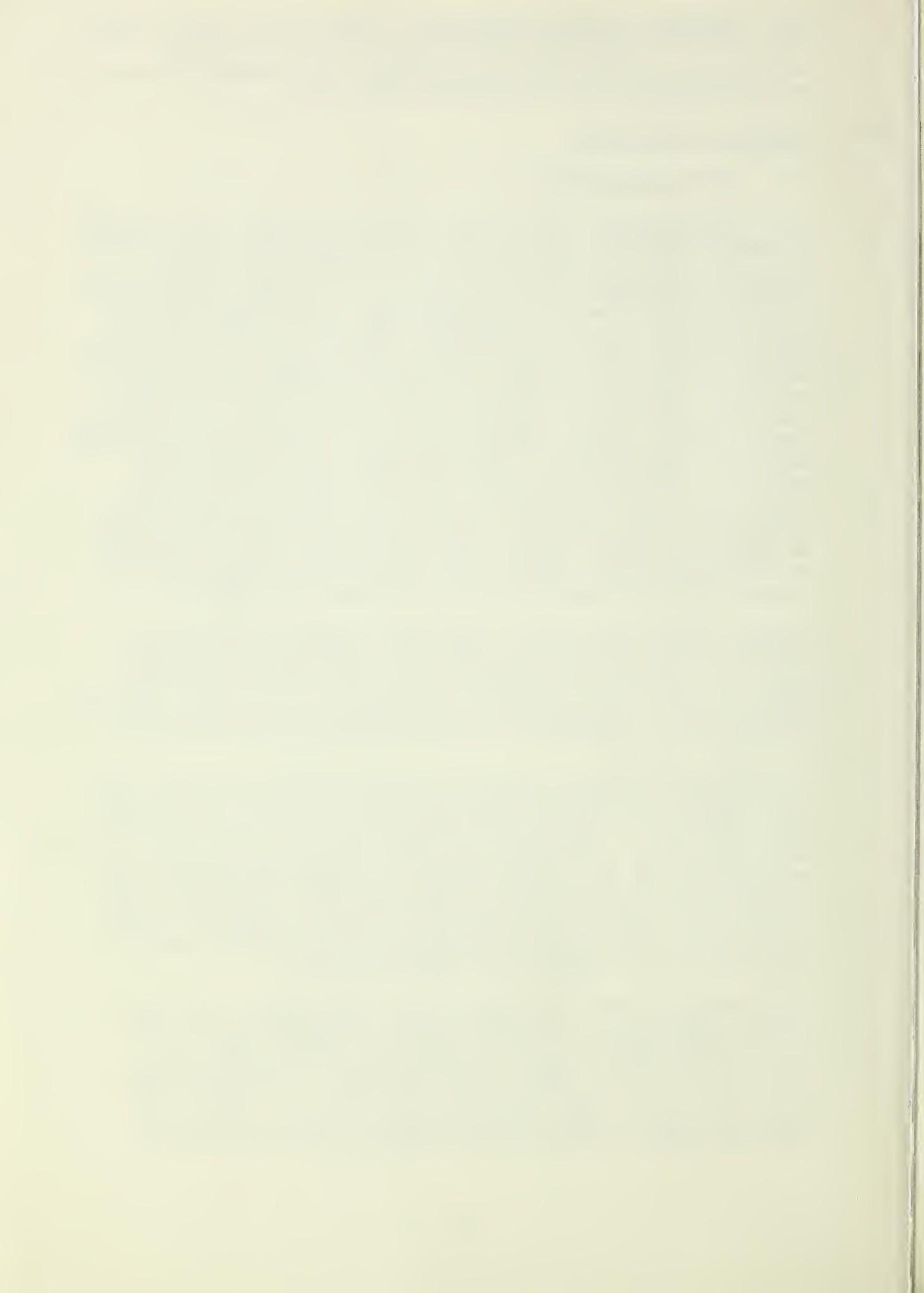
271. Photo Index Prints

271.1 Preparation. Photo indices shall be prepared from accepted photography by assembling the individual singleweight contact prints into their proper relative position and directly copying the assembly photographically to a scale of 1" to 1 mile. Such contact prints shall be trimmed to the image edge. The assembly shall be carefully laid to match corresponding images and clearly show the roll and serial number of each print. There shall be no dovetailing of prints within the assembly. At breaks in flight strips, only that print required to provide no less than 100 percent nor more than 140 percent endlap shall be used in the assembly. The contrast and tone of all contact prints used in the assembly shall be uniform. Except for small projects, the final format of the photo index shall be in fifteen minute (15') quadrangle sheets or portions thereof for the 48 contiguous States. In Alaska the final format of the photo index shall be in sheet sizes of fifteen minutes (15') of latitude by twenty minutes (20') of longitude south of latitude 59° north and fifteen minutes (15') of latitude by twenty-two and one-half (22½) of longitude north of latitude 59° north.

Projects smaller than one 15' quadrangle in area, but which fall into more than one 15' quadrangle, may be placed onto one photo-index. For these small projects, geographic position tick marks shall be placed every 2½ minutes of latitude and longitude. Editing, titling, scale, orientation, and preparation shall be the same as for larger projects.

The quadrangle boundaries shall be correctly positioned on the photo index negative and clearly identified with crossmarks and geographical coordinates. Tick marks indicating the location of seven and one-half minute (7½') coordinates in the 48 contiguous States and seven and one-half (7½) by ten (10) minutes in Alaska south of 59° north latitude shall be placed on all index negatives. In Alaska, north of 59° north latitude, tick marks indicating the location of seven and one-half minutes (7½') by eleven minutes and fifteen seconds (11' 15") shall be placed on all index negatives.

The quadrangle corner ticks and the five intermediate tick marks shall be delineated in correct position on the non-emulsion side of the index negatives by use of lines .02 inch in width, and shall be .15 inch in length in each direction. The intermediate ticks shall be correctly positioned and shown in a similar line weight and length. The four corner ticks shall be labeled with their geographic coordinates in accordance with this paragraph.



271.2 Editing Stick-up on Photo Indices. Before the index assembly of prints is photographed, stick-ups bearing designating symbol, roll identification, and exposure numbers shall be placed on every contact print with exposure number ending in zero or five and at each break in flight. The stick-ups shall be neatly placed along the top of the contact print and positioned so as to completely cover the lettering appearing on the print which it identifies. County names will be indicated by stick-ups on each index on which county boundaries appear. Flight line placement for mapping photography may result in a lack of identification on some flight strips falling within the fifteen minute (15') quadrangle unit due to the small reduction required. Should this occur, such prints will be identified by stick-ups so placed as to appear on the index negative. The lettering placed on the stick-ups will be of such size as to withstand the necessary reduction of the assembly to the final scale of one inch to one mile (1" to 1 mile). After reduction, the lettering should be approximately 1/16" high.

271.3 Title Block. Each photo index negative shall contain a neat and legible title block. Figure 271.33 exemplifies a standard 15' index sheet with the required data shown. The title block for each sheet shall be placed on and photographed with the assembly of prints and shall be positioned to appear across the bottom of each negative. The title block shall be prepared so that the size and weight of the lettering after reduction will be legible. The index prints for each area having the same designating symbol, irrespective of the number of units involved, shall be numbered in an unbroken series commencing with number one(1).

For small projects (those which do not exceed three 15' quads vertically and four 15' quads horizontally), the project layout will be as in figure 271.31. Sheets will be numbered from south to north and east to west in all instances.

For larger projects, the project layout will be as in figure 271.32.

The proper block for each individual sheet shall be shown by crosshatch on the corresponding negative.

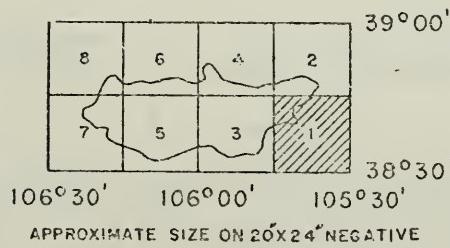


Fig. 271.31

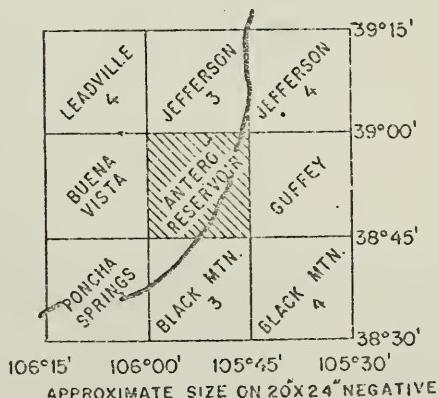
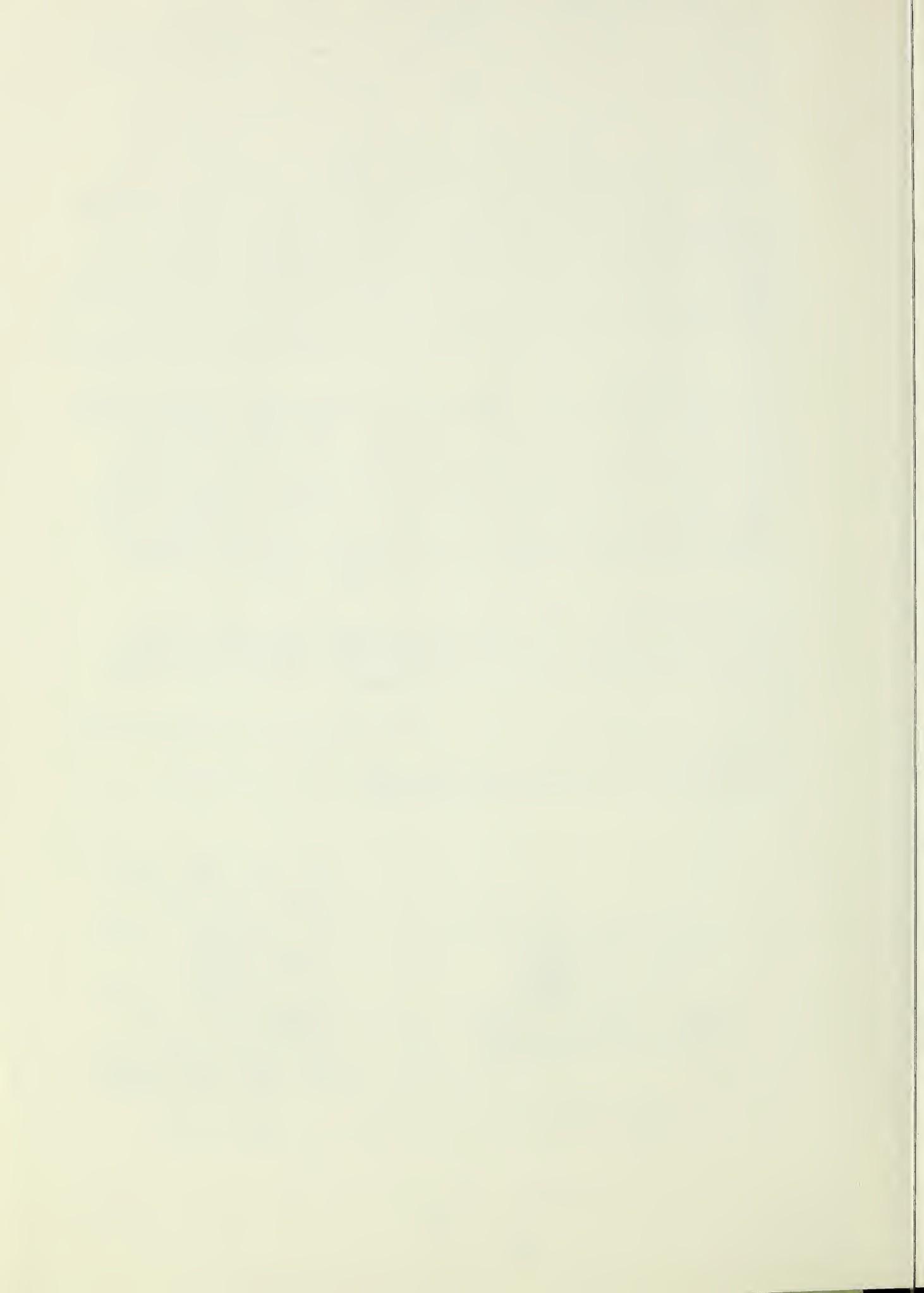


Fig. 271.32



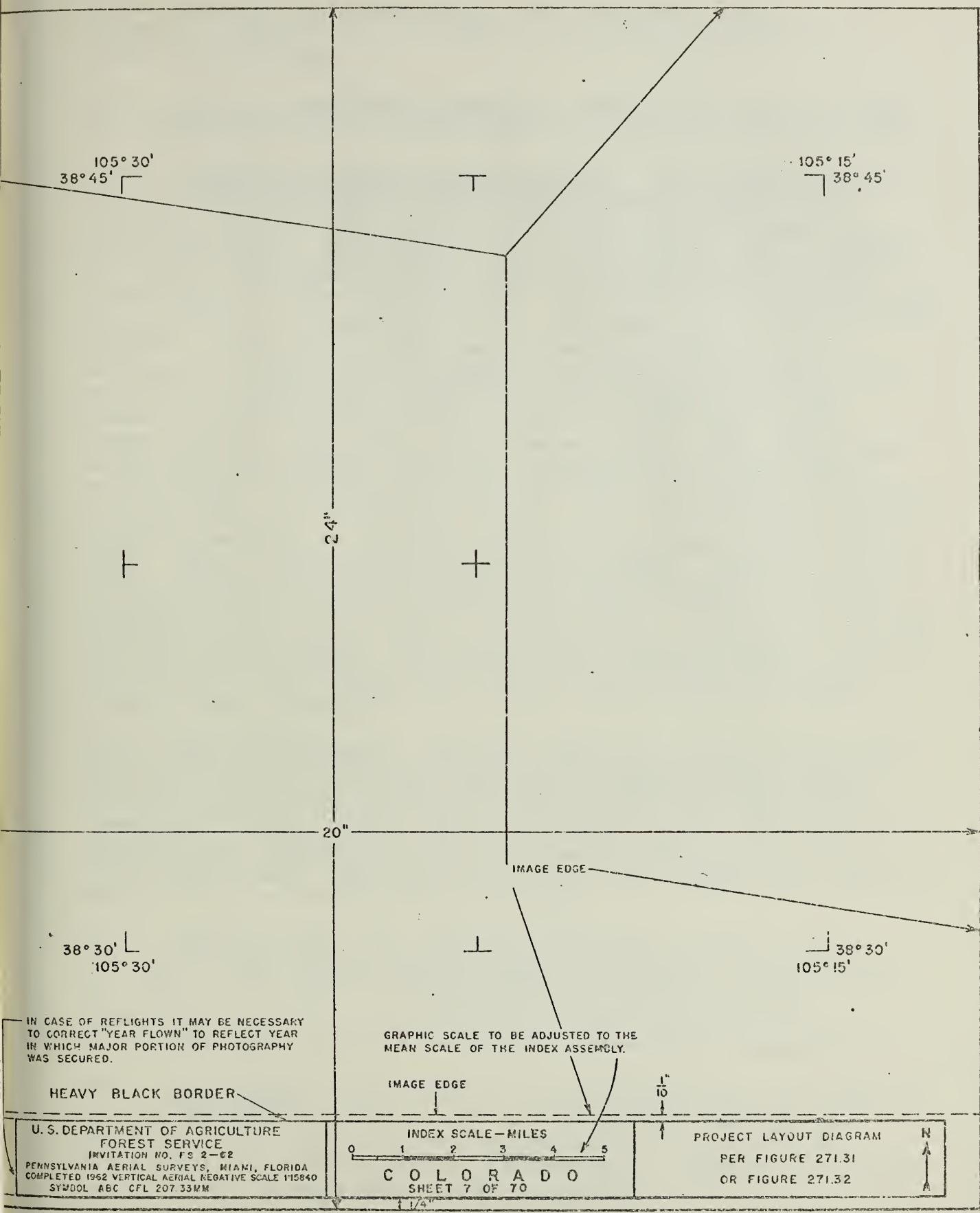
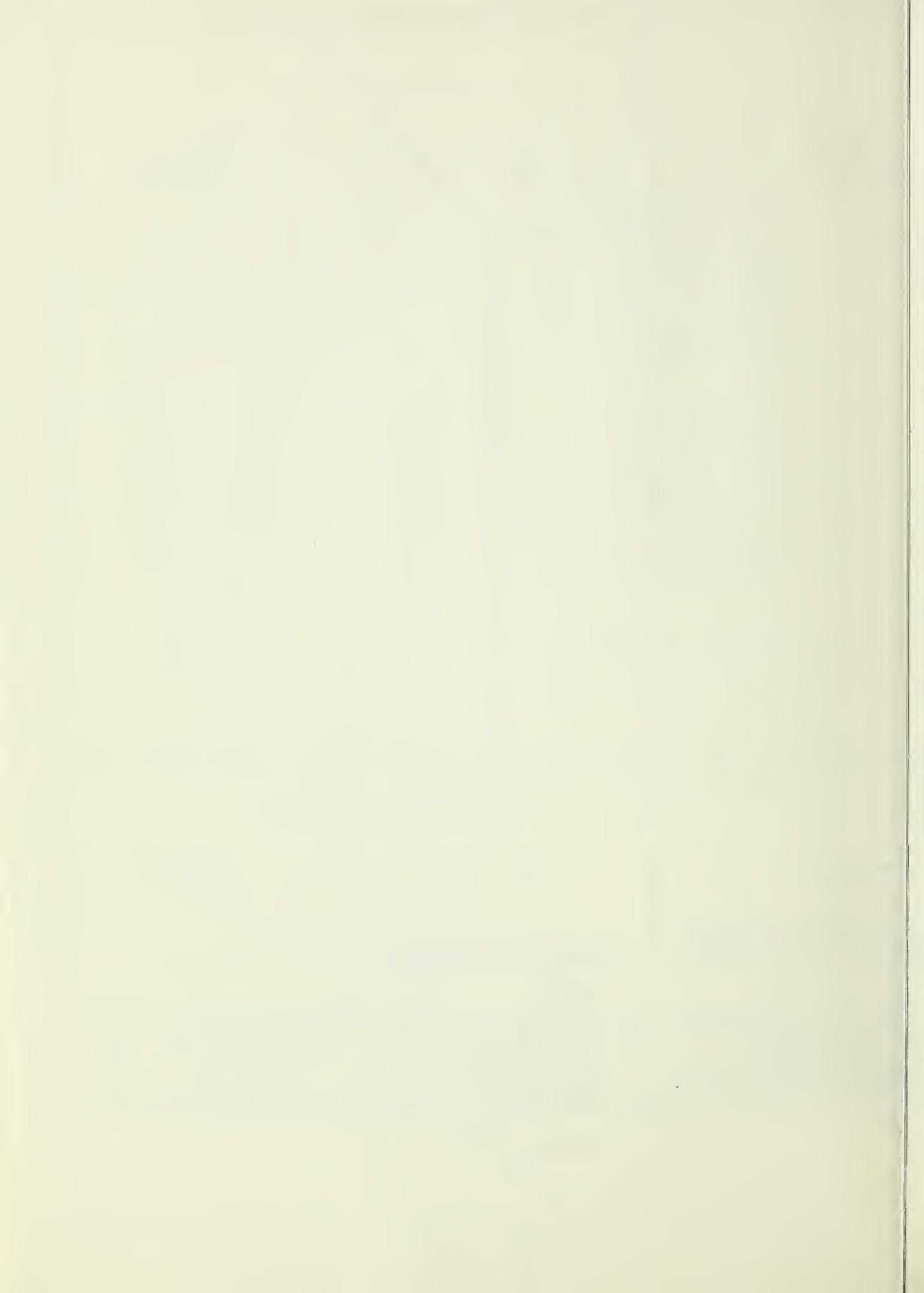


FIGURE 271.33
22



271.4 Orienting the Index Sheet. Each index sheet shall be oriented so that north is at the top of the sheet regardless of direction of flight.

271.5 Scale of Photo Index Negatives. Photo index negatives shall be copied at a scale of approximately one inch (1") to one (1) mile.

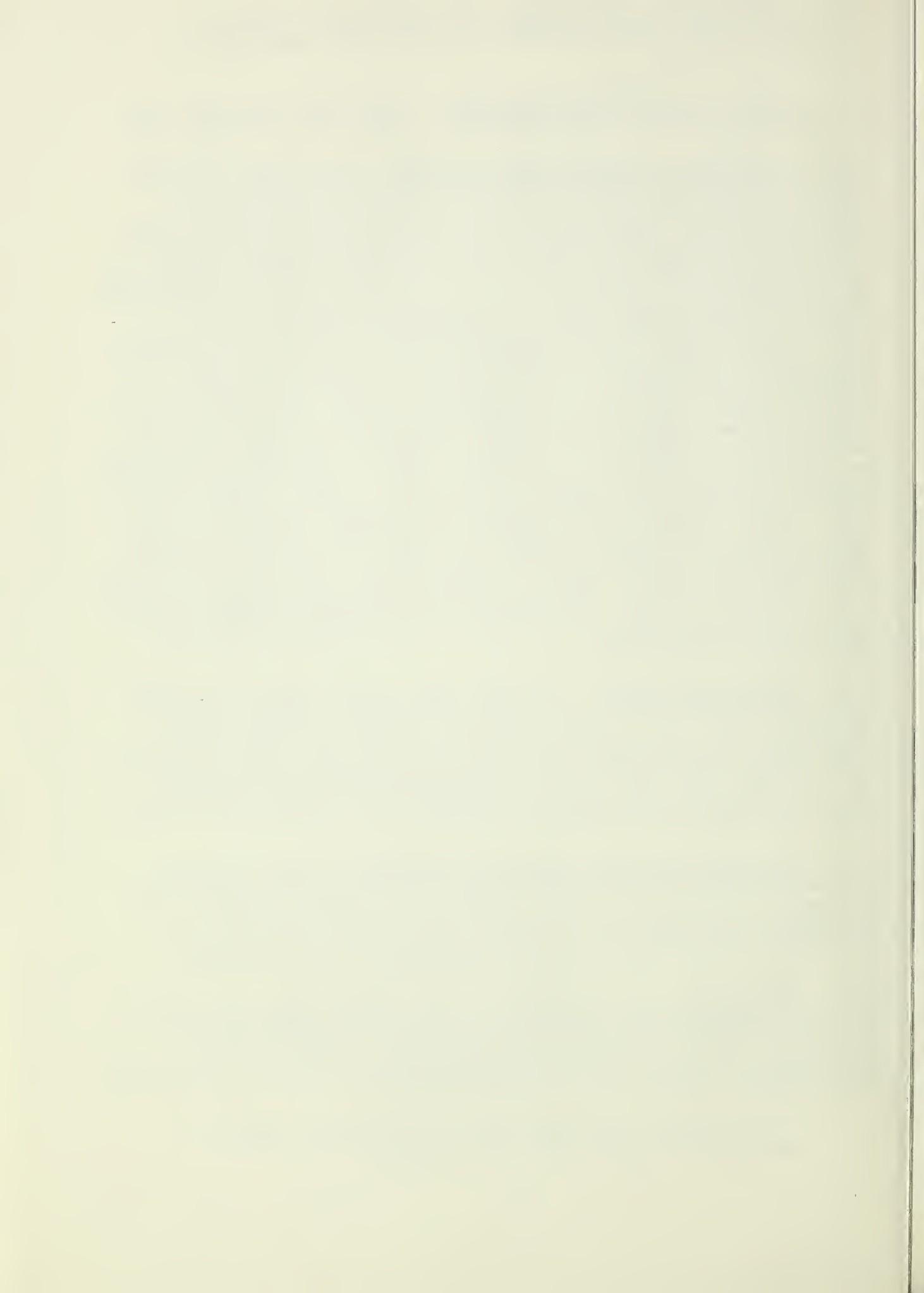
271.6 Preparation of Photo Index Negatives. Photo index negatives shall be prepared by photographing the assembly of singleweight contact prints onto 51cm by 61cm (20" x 24") unexpired commercial, safety base film. Splicing will not be permitted on index negatives. All photo index negatives shall conform with photographic quality requirements of these Specifications. The format of the negative will be as required by paragraph 271.1 for quadrangle units or portions thereof. County, area, and/or unit boundaries shall be neatly delineated in their correct geographic positions on the non-emulsion side of the negatives by use of lines not in excess of two one-hundredths inch (0.02") in width, using a standard type opaque. County boundary lines shall be delineated to agree with conventional topographic map symbols, and project boundaries by a solid line of similar width. Both shall be broken at points intersected by stick-ups or lettering on prints in the assembly. Where county boundaries and project boundaries are identical, the project boundary symbol will be used. Where a sheet is not contiguous to another, all areas on the index outside of the index assembly and title block shall be masked from the negative using a graphite type opaque. In order that imagery will bleed from sheet to sheet, no border shall be provided in the overlap area between sheets. No portion of the required coverage outside of an area or unit boundary shall be cut off or otherwise deleted from the index negatives.

271.7 Photo-index Prints. The photo index prints shall be prepared by contact printing the index negatives on unexpired white opaque polyester base contact printing material having a thickness of not less than 0.178 mm (0.007") and a semi-matte surface. There shall be uniform tone, contrast, and density throughout all prints required of an area or unit. The quality of prints shall conform with requirements of Section 250 of the Specifications.

271.8 Remaking Photo Index Negatives and Prints. When necessary to remake a photo index negative because of reflights ordered by the Government or because the index negative was rejected by the Government, the remade index negatives and prints shall be prepared in the same manner employed in the preparation of the originals.

272. Spot Indices. When specified in the Solicitation, Spot Indices will be provided by the contractor in lieu of Photo Index Prints. The Forest Service will provide the contractor a map or maps of the project. The contractor is to determine the location of individual photo centers and spot them on the quadrangles.

1. Waterproof India black ink, or equivalent, shall be used for all delineations and lettering.



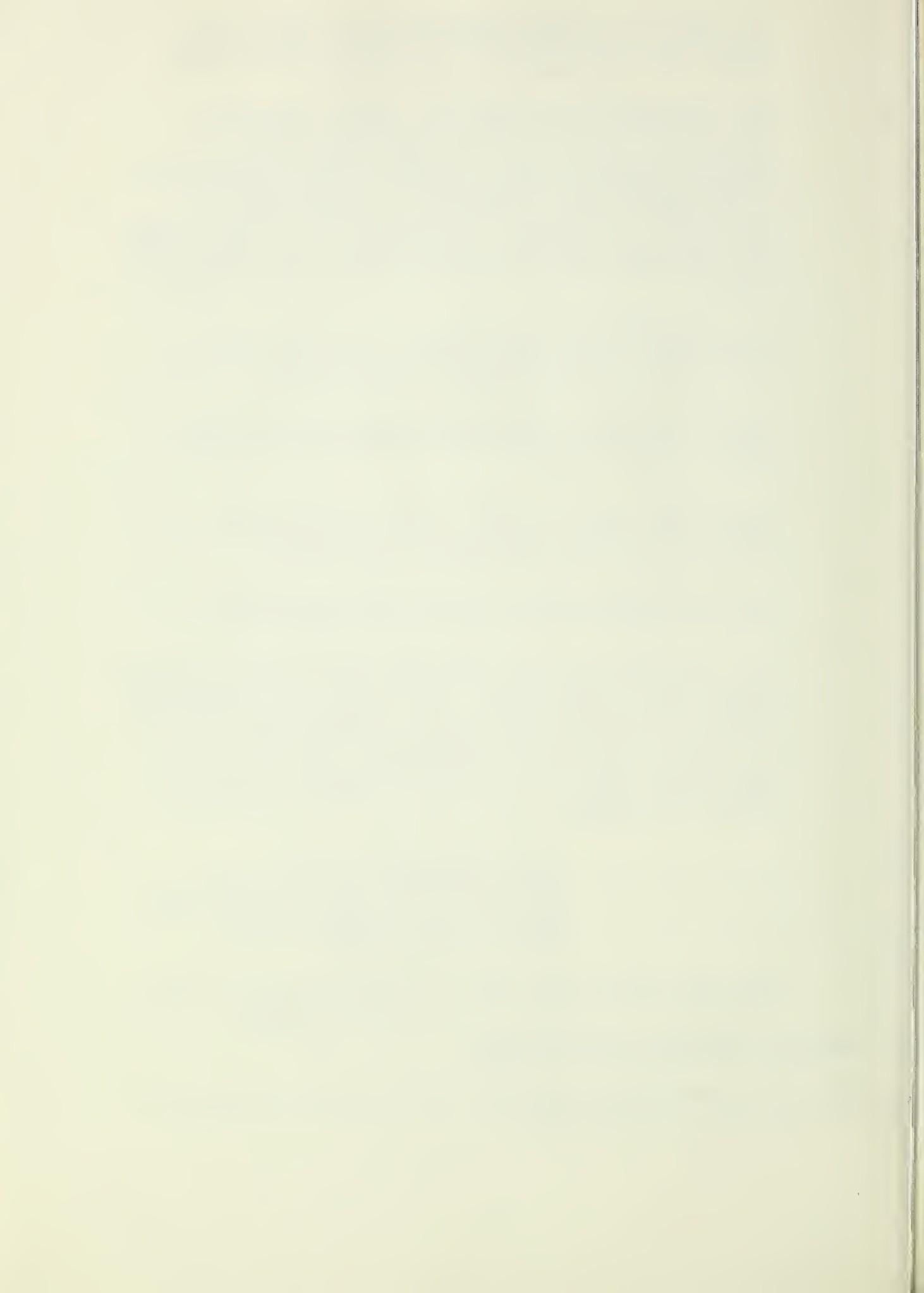
2. Locations of photo centers are to be shown on the quadrangles by a one-tenth inch (1/10") diameter circle using a #2 Rapidograph pen, or equivalent.
3. The negative roll number and exposure number of the terminal prints of each flight strip on each quadrangle shall be lettered, using numbers approximately fifteen hundredths inches (.150") in height, using a #1 Rapidograph pen, or equivalent. Numbers shall be located directly beneath the pertinent photo center. Where map detail or congestion prevents clarity, the number shall be placed above or to the right or left of the pertinent center.
4. Every fifth (5th) exposure of every flight strip (those with the last digit ending in five or zero) shall be lettered in the same manner as Item 3 above.
5. Where breaks in flight strips occur, both exposures having 100 percent endlap shall be lettered in the same manner as Item 3 above.
6. Locations of photo centers shall be within five hundred feet (500') of true location at quadrangle scale consistent with type and density of map detail.
7. All lettering may be done free hand, providing it is neat, of uniform size and quality, and easily read.
8. In the space provided along the bottom margin of the map, the contractor shall show the following items: Designating symbol, year of photography, camera number, calibrated focal length of the lens, type of negative emulsion used, and the negative scale of the photography. Also to be shown is a project layout (per Fig. 271.31 or Fig. 271.32) the sheet number (Sheet _____ of _____) and the appropriate legend, for example:

Aerial Photography Project
Arapaho National Forest, Colorado
Order Prints from Forest Service, USDA
Bldg. 85, Denver Federal Center
Denver, Colorado 80225

Lettering shall be done using a #1 Rapidograph pen or equal, and shall be from 0.15 inch to 0.20 inch in height.

280. NEGATIVES AND PRINTS TO BE DELIVERED

The following photographic materials shall be delivered prepaid to destinations designated in the contract.



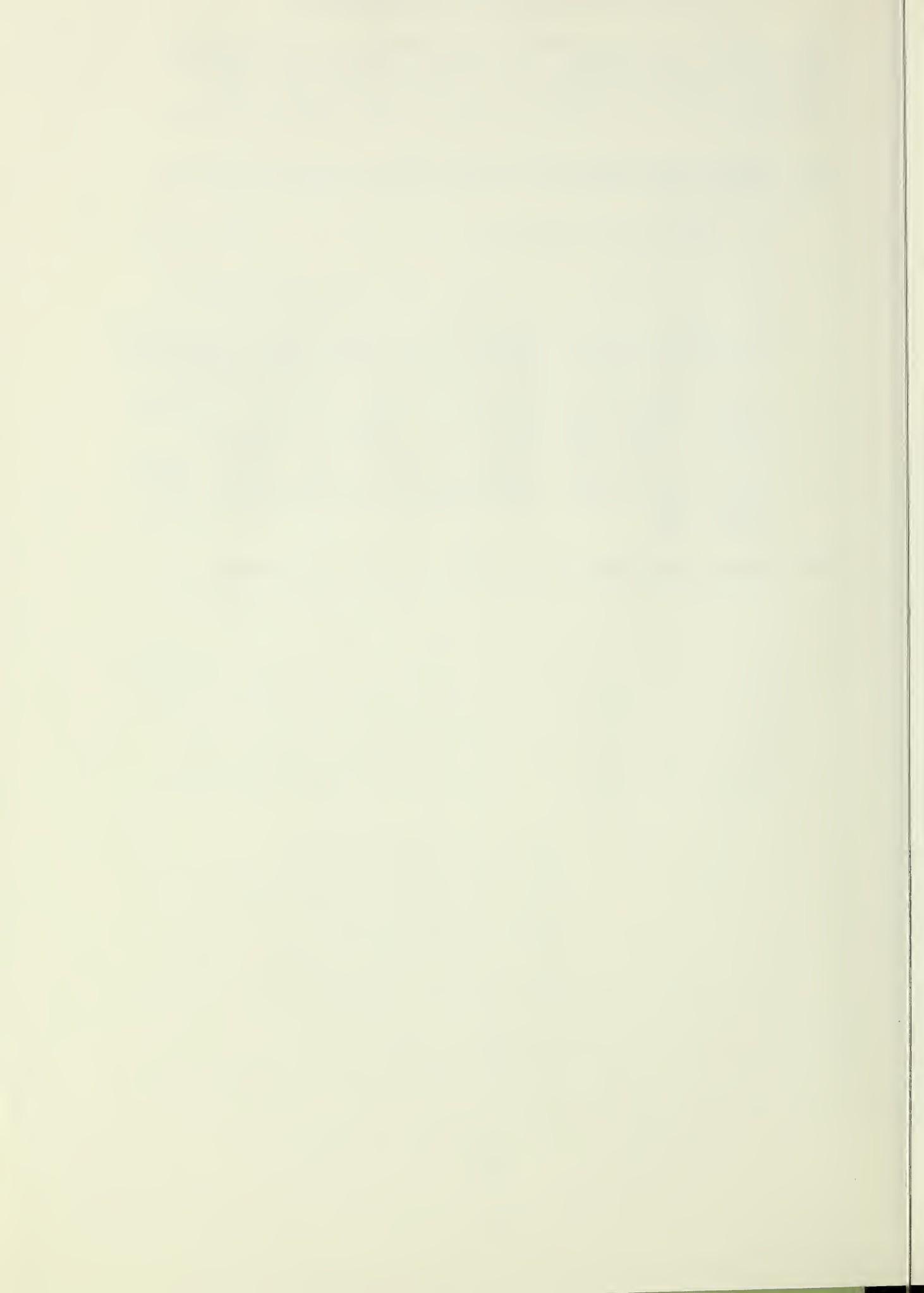
281. All aerial negatives and/or transparencies.

282. Aerial contact prints in the quantity, and of the type specified in the contract. All contact paper prints from vertical negatives (except those used for the photo index assembly) shall be trimmed to leave a 1/16" margin outside the image area.

283. Photo Index Materials (If spot indices are not specified in the Contract).

1. Photo-index negatives.
2. Two (2) sets of polyester base photo index prints.
3. One (1) set of singleweight contact prints (one printed from each negative required in the photo index assembly). The singleweight contact prints used in preparing the photo index assembly may be delivered for this set if in good condition and acceptable to the Government. Prints shall be free from folds, tears, cracks, or damaged emulsion, pressure sensitive or other tape, rubber cement, grease pencil, ink, or other marks on the surface other than staple holes. These prints shall be trimmed to the image edge.

284. Spot Index Maps (If specified in the solicitation).



310 INSPECTION PROCEDURE. Paragraph (a) of Clause 7, Form 6300-38, General Provisions, is deleted and the following substituted therefor:

311. Preparation for Inspection. Inspections will only be made using contact prints from properly edited negatives. Prints of such quality that the terrain is not readily discernable or from negatives with grease pencil or other temporary markings are not considered suitable for inspection purposes. Prints shipped for inspection purposes will be arranged in order by flight strips and separated by a paper band placed around each set of prints. Within each flight strip, the prints shall be arranged in numerical sequence from north to south or from east to west.

312. Inspection Phases. Inspection by the Forest Service shall consist of three phases.

Phase I is the inspection for coverage; i.e., endlap, sidelap, adherence to proper flight path, scale, stereoscopic coverage to flight line termini, absence of clouds, absence of cloud shadows, etc. This phase shall be made using vertical prints provided by the Contractor for that purpose.

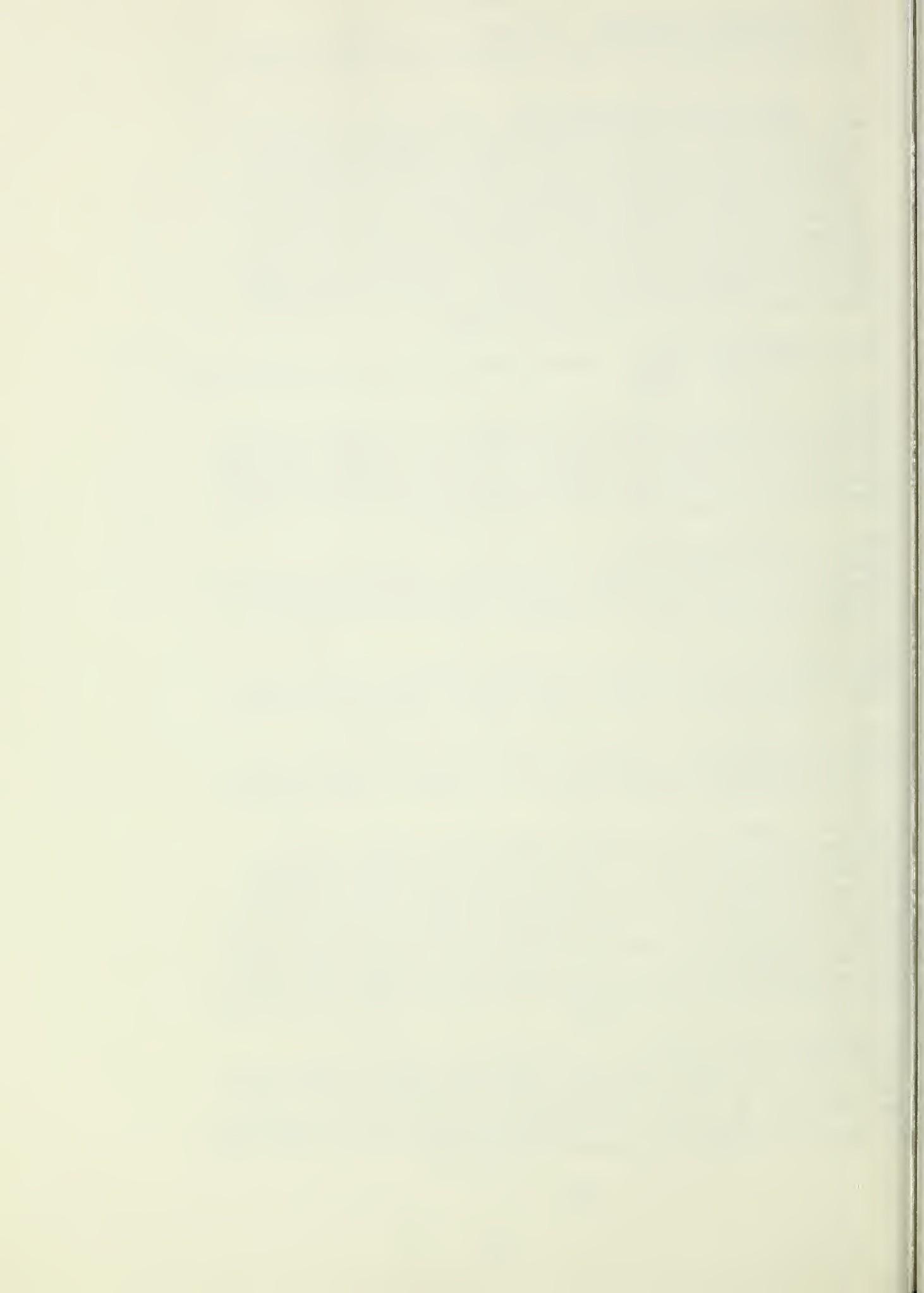
Phase II is an inspection of the vertical negatives for proper density and contrast, stains, reflections, detail, ground movement, etc., and for the negatives physical quality; i.e., freedom from rips, tears, scratches, etc.

Phase III is for the quality of the delivered vertical prints, photo index negatives, photo index prints, and a final inspection of the vertical negatives for physical quality.

If initial inspection is made in the Contractor's plant, the Phase I and Phase II inspections will be made at the same time by the Government representative.

If Phase I inspection is made at the Forest Service office, then the Contractor should ship both film and prints together so that Phase I and Phase II may be combined. The Contractor may, with concurrence of the Contracting Officer, ship only the materials for the Phase I inspection, and have the Phase II and Phase III inspections combined. This latter option saves time and film shipping expenses, but the Contractor shall bear all the risk of preparing delivery prints and indices from vertical negatives which may not be accepted.

If negatives are not shipped, and during the Phase I inspection, on the basis of prints furnished, the Contracting Officer questions the quality of the negatives, he may call for the negatives for a Phase II inspection. Acceptance of prints for coverage does not imply or indicate acceptance of negatives.



313. Inspection Schedule. For Phase I inspection, the Forest Service shall inspect and accept or reject materials within 21 calendar days after notification (in plant inspection) or receipt of materials (inspection in Forest Service office).

For Phase III inspection, the Forest Service shall inspect and accept or reject materials within 21 calendar days after receipt of materials, exclusive of those negatives requiring target identification and measurements. For these negatives 30 calendar days will be required (See Section 243 of these Specifications). Phase II inspection will be combined with either the Phase I or Phase III inspection above.

320. DELIVERY SCHEDULES. Within four (4) weeks after the last exposure of a roll of aerial film, the Contractor shall deliver to the Forest Service prints and, negatives for inspection, or request an in-plant inspection.

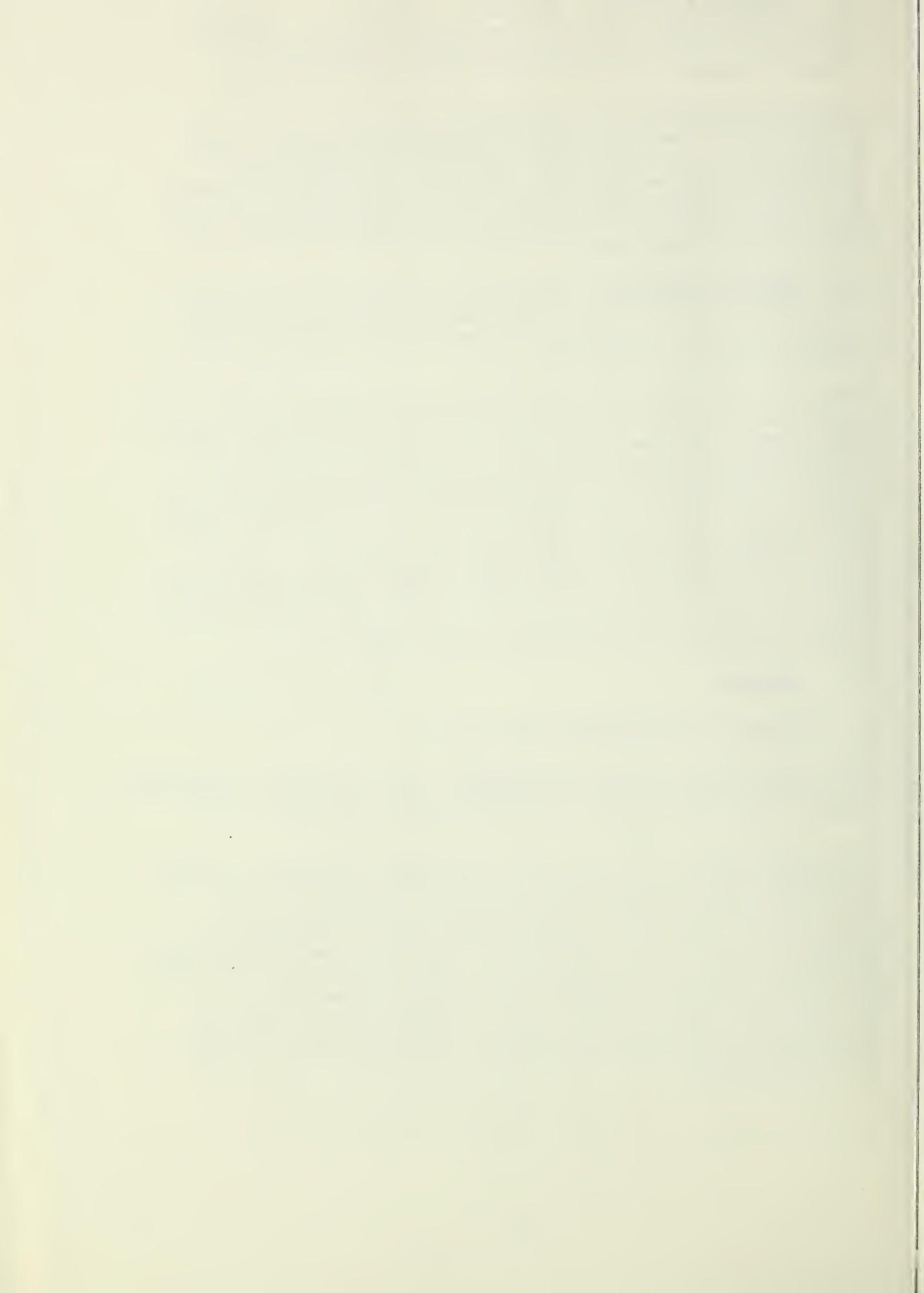
Within four (4) weeks after notification of acceptance, the Contractor shall deliver (subject to exception below), the prints, index prints, index negatives, vertical negatives, and any other delivery materials required. The only exception will be when acceptable photography needed to complete a photo index mosaic is lacking. When this occurs, the Contractor will retain the single weight glossy prints needed for the index mosaic and provide the vertical negatives and any other materials called for. Index prints, index negatives, and the single weight glossy prints used therefore, shall be delivered within four (4) weeks after acceptance by the Forest Service of the last photography needed to complete the mosaic of an individual photo index print.

330. SHIPMENTS.

331. Shipment of Photographic Materials.

331.1 Preparation of Film for Shipment. All film shall be thoroughly cleaned and placed on spools of approximately 13.3cm (5 $\frac{1}{2}$ inches) diameter, with the emulsion facing the core of the spool.

331.2. Film Cans. All aerial roll film shall be shipped in sturdy cylindrical metal or plastic cans. Metal film cans shall be lined with a substantial snug-fitting cylindrical cardboard or fibre liner having a thickness of approximately 3/32." The bottom and lid of metal cans shall be similarly lined and all such lining shall be glued in place or held by pressure. The finished inside diameter of film cans shall correspond to the diameter of the film spool. The top of the can and the lid shall be smooth with no sharp projections which might present a hazard to handlers. Film cans furnished which do not meet these specifications may be rejected by the Forest Service.



331.3. Film Can Labels. Film can labels will be furnished by the Forest Service. A film can label will be prepared for each can and securely fastened to the side of the can to which it pertains.

331.4. Packaging for Shipment. All aerial film cans will be carefully packed in substantial boxes for shipment. Damaged cans or contents will be replaced by the Contractor at his expense. Contact prints will be arranged in order of flight and each flight bound and identified by flight strip number and inclusive roll and exposure numbers. Photo index film and prints shall be shipped in a flat container of proper size.

331.5. Receipt from Common Carrier. The Contractor shall furnish promptly to the Forest Service a receipt from the common carrier, or a photographic copy thereof, showing clearly the date of each separate shipment. A copy of the packing list shall be attached to the receipt from the common carrier.

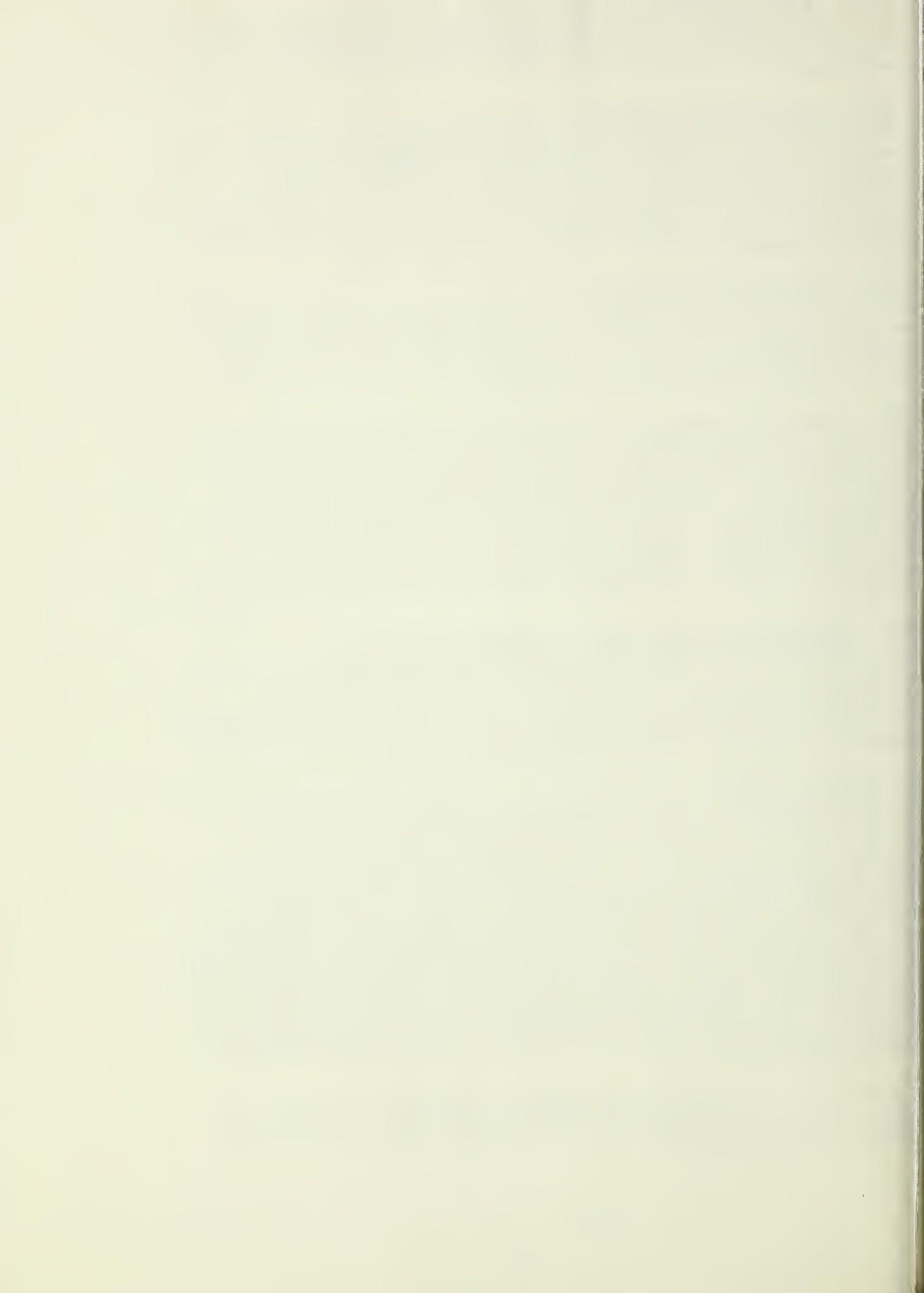
332. Shipping Procedures. All shipments of prints and negatives shall be at the Contractor's expense. Shipments will be made by air express or similar means of transportation. The inspection set of prints and vertical negatives (if shipped for inspection purposes prior to final delivery) will be returned to the Contractor immediately after inspection is completed. This return shipment will be by air express, collect, and without valuation, unless the Contractor furnishes a valuation to be used for shipping purposes.

340. VERIFICATION CAMERA TESTS - MAPPING PHOTOGRAPHY.

When ordered by the Contracting Officer, for the purpose of testing stereomodels, on the basis of suspected deficient photography obtained and delivered, the Contractor shall expose, over an approved test area, with the camera(s) he has used, at least six overlapping negatives, and deliver these to the Forest Service.

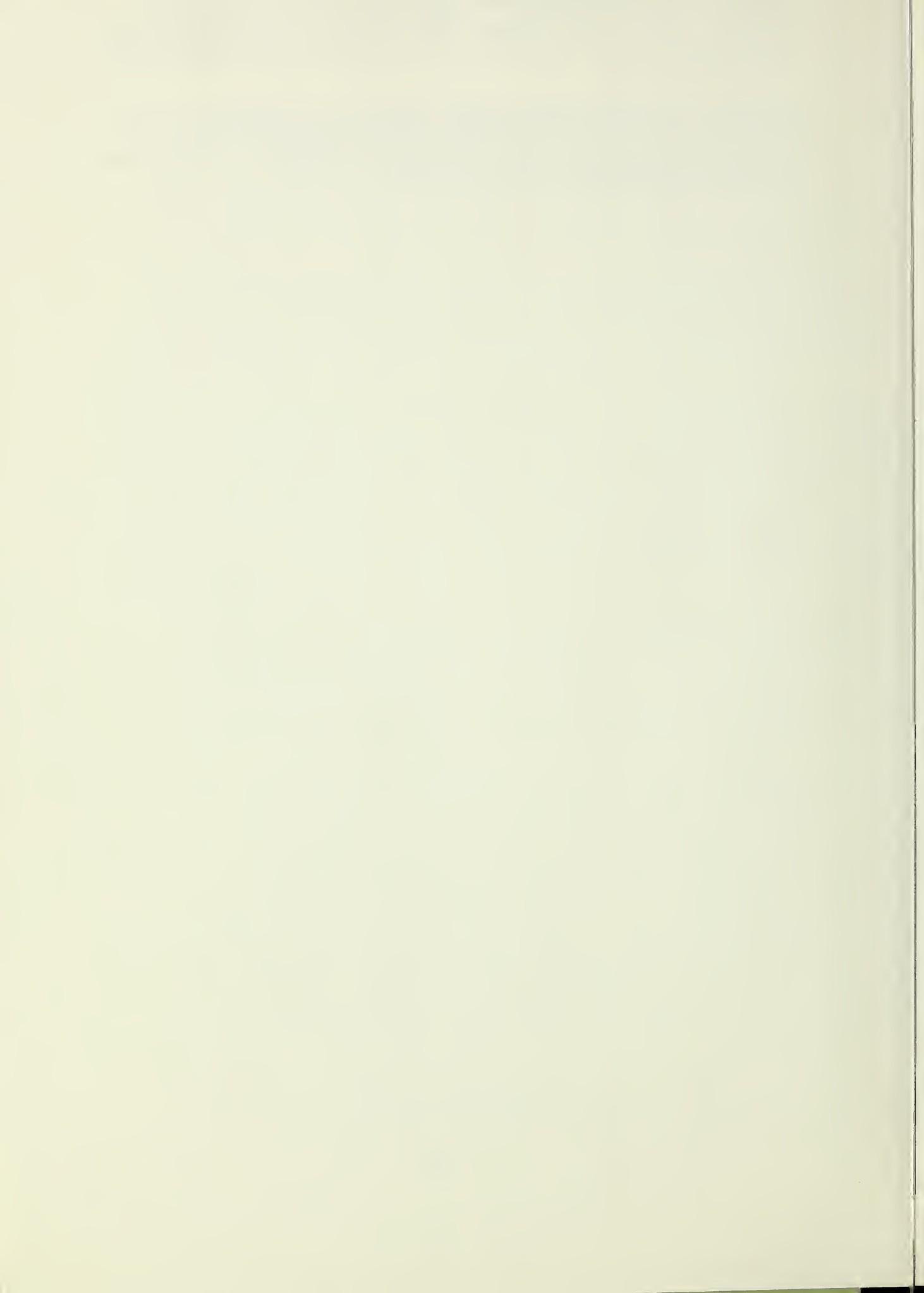
The negatives shall be exposed at the altitude specified by the Contracting Officer to provide adequate coverage of the test area and shall meet all requirements for overlap, tilt, crab, film quality, etc., as set forth in these specifications. The negatives shall be identified as to the Contractor's name, camera number, flight height, and date of photography. The area to be photographed shall be (1) an area where at least thirty (30) readily identified vertical control points, well distributed throughout the overlap area of two negatives has been established or (2) an area designated by the Forest Service. Contact prints of the above negatives shall be submitted with identification of vertical control points which have been established with an accuracy of 1/10,000 of flight height above the assumed ground datum.

When such test is ordered, an equitable adjustment in contract time and/or price shall be negotiated in accordance with Clause 2, Form 6300-38, General Provisions.



Any resulting stereomodel in which any elevation discrepancy exceeds 1/6000 of the flight height above assumed ground datum shall be cause for rejection of the camera and any photography obtained with it.

Any other deficiencies observed, which in the judgment of the Contracting Officer shall render the photography unusable for its intended purpose, shall be cause for rejection of the camera and any photography obtained with it.



DIVISION 400 - MEASUREMENT AND PAYMENTS

410. PAYMENTS. Paragraph (a) of Clause 9, Form 6300-38, General Provisions, is deleted and the following substituted therefor:

Payment with respect to each item area will be made upon completion, final inspection and acceptance of all work in connection with any such area.

411. Basis for Payment. For payment purposes, the accepted bid price per lineal mile shall be the unit price for payment of photography. For payment purposes, the length of the lines to be used will be based on the distances between terminii of the flight lines. It shall be expressly understood and agreed that such mileage figures, as setforth in the solicitation, are not subject to adjustment.

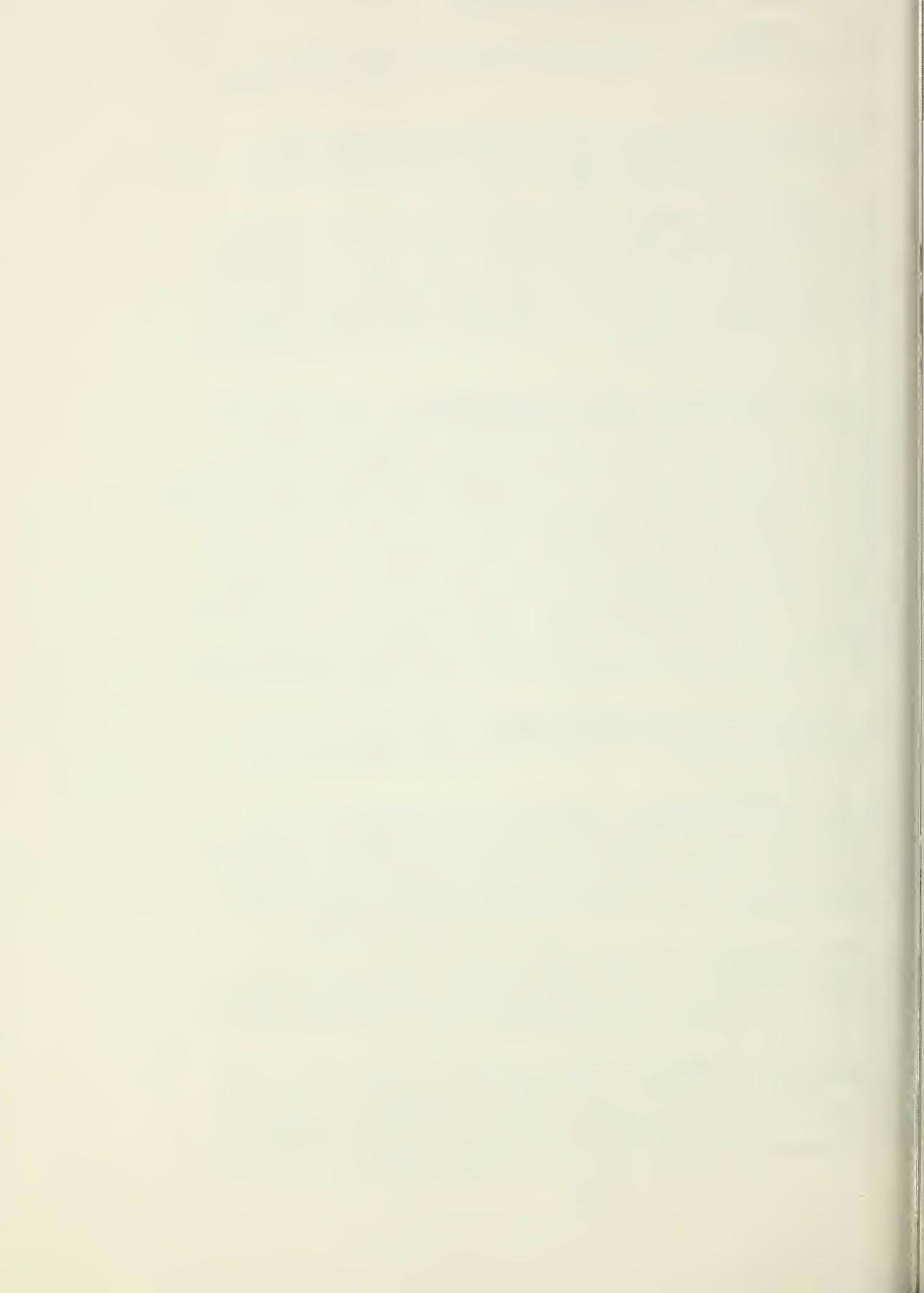
412. First Year Completion Incentive Payment. (Not applicable to mapping photography items.) For each complete item photographed within the limits of the first photographic season as specified in the solicitation and for which complete and acceptable materials are timely shipped in accordance with these specifications, the Forest Service agrees that the Contractor shall be paid 40 cents per square mile in addition to the accepted bid price as a "first year" completion incentive. All photographic materials timely shipped in accordance with the above shall be acceptable to the extent that no reflights are required by the Forest Service which cannot be secured during the first photographic season, processed, and shipped on or before the last date for making such shipments. The incentive payment will be made upon determination by the Forest Service of eligibility for such payment.

413. Payment for Second Year Shipments. The payment for all items completed during the second photographic season will be the accepted bid price.

414. Gap Flight Payments. Payment for gap strips made by the Contractor to correct inadequate sidelap where flight line spacing and flight altitude are furnished by the Forest Service shall be made only after determination by the Forest Service that original photography was obtained over the plotted position within the allowable deviation and at the permitted flight altitude.

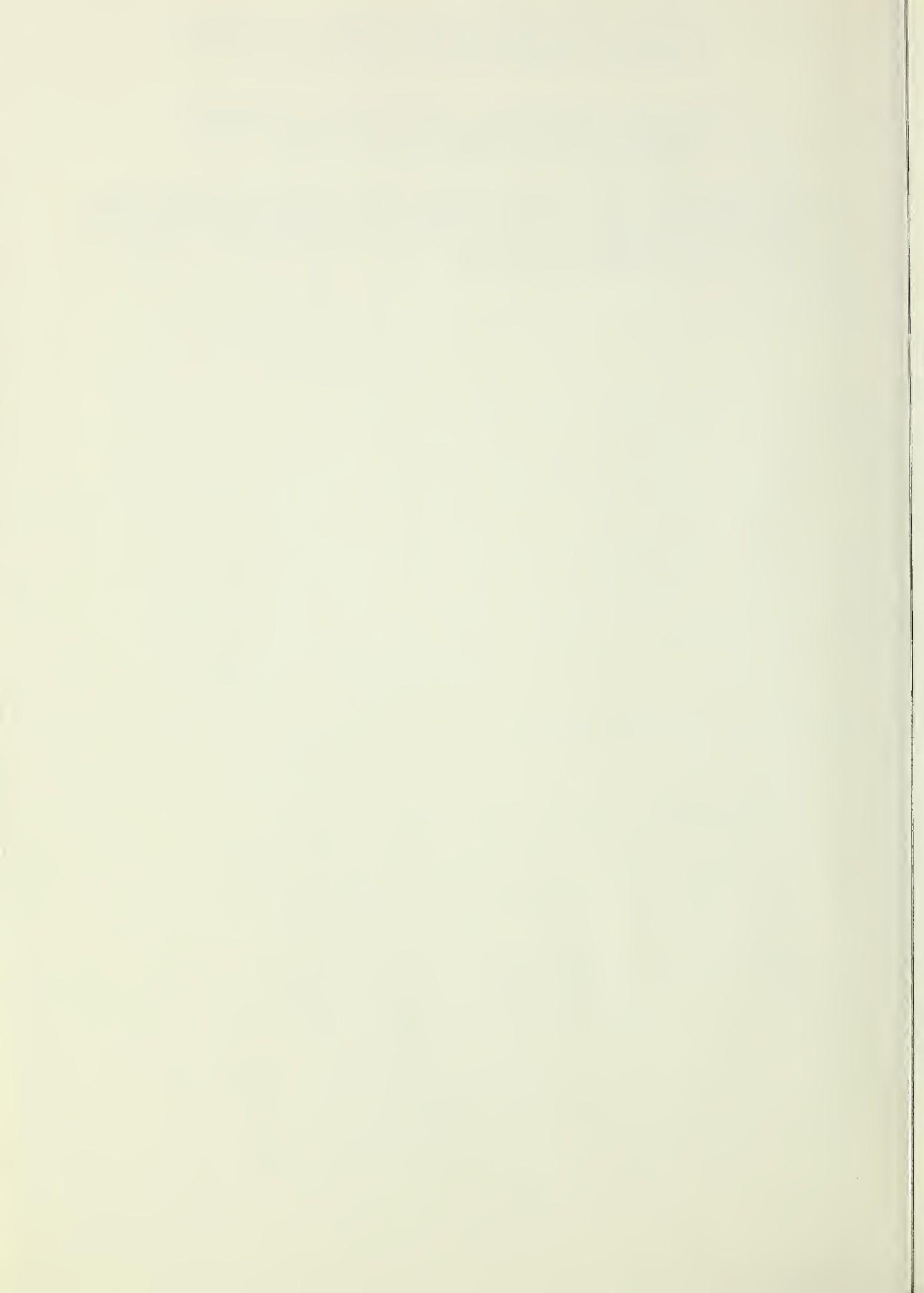
For payment purposes, the bid price per lineal mile will be the unit price for payment of gap flight strips. For payment purposes, the length of the gap flight strip will be that specified by the Forest Service to insure satisfactory coverage.

420. LIQUIDATED DAMAGES. Pursuant to Clause 3, Form 6300-38, General Provisions, if the Contractor fails to complete the work or services within the time specified, or any extensions thereof, there will be deducted from payment to him, as liquidated damages, not as a penalty, a daily charge as specified below:



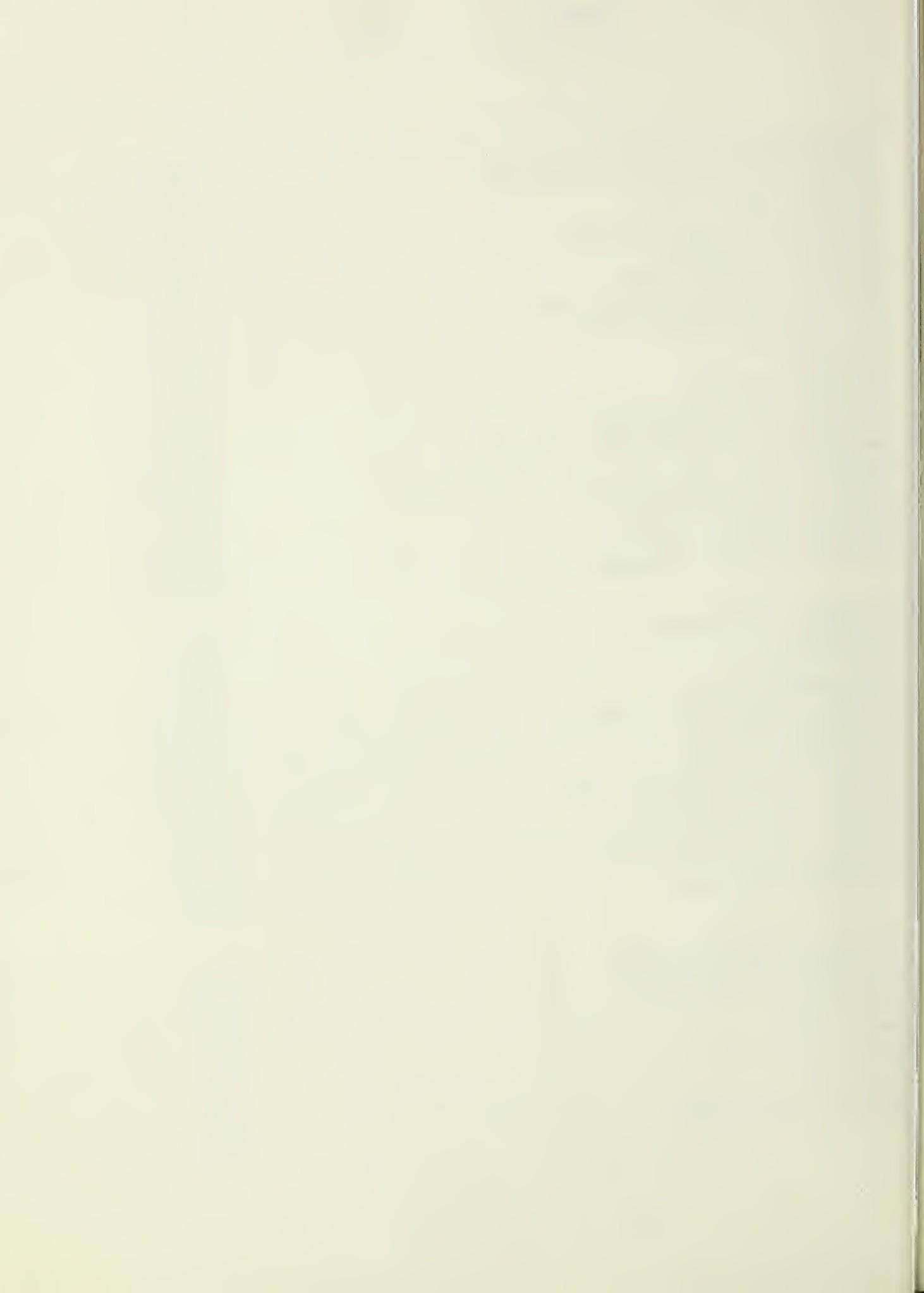
- A. \$10 for each calendar day of delay, or fraction thereof, in mailing Weekly Progress Reports, as specified in Section 132.
- B. \$25 for each calendar day of delay, or fraction thereof, in shipping photographic materials as specified in Section 320.

The Contractor shall not be charged with liquidated damages when the delay arises out of causes beyond the control and without the default or negligence of the Contractor as specified in Clause 3, Form 4000-38, General Provisions.

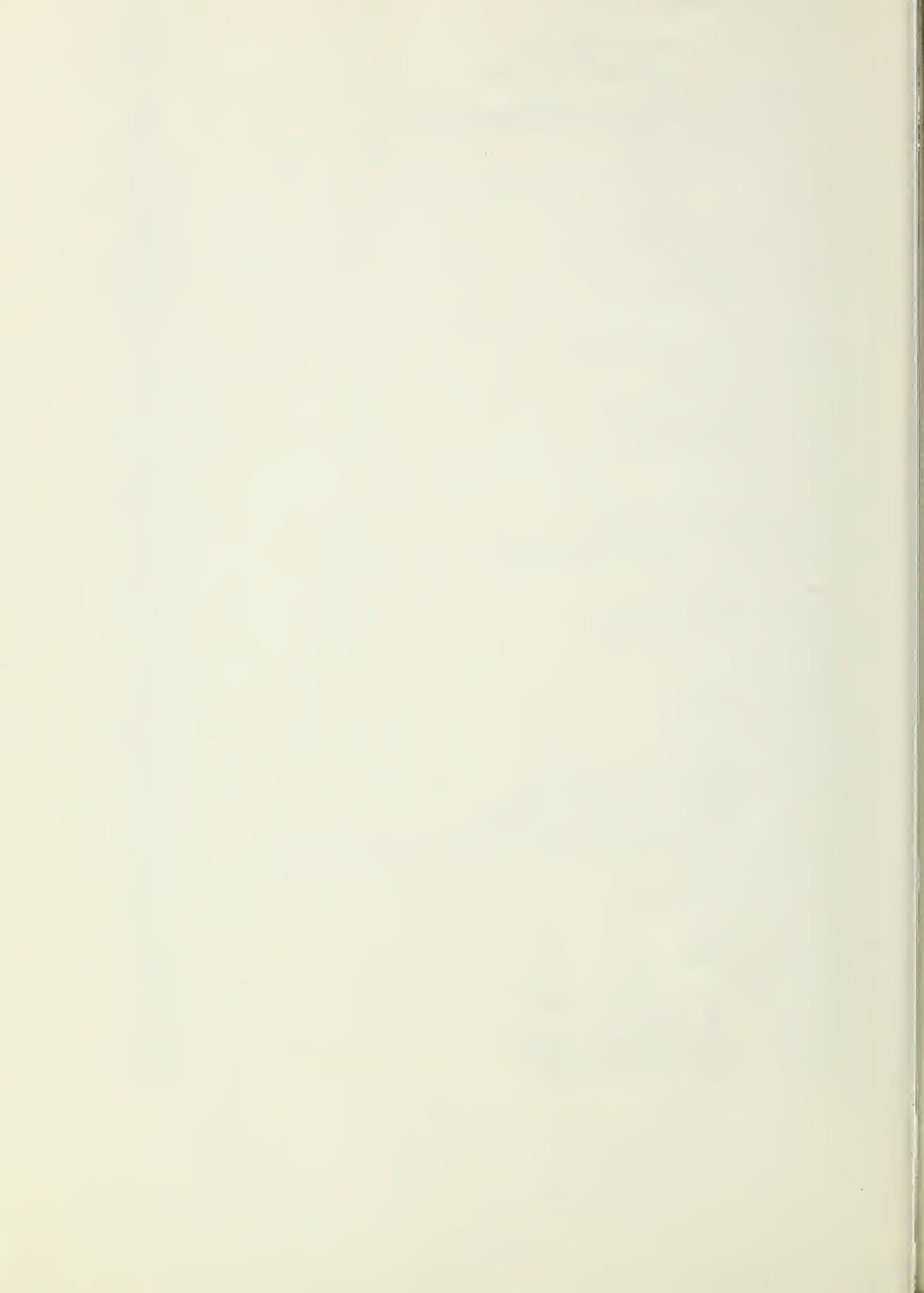


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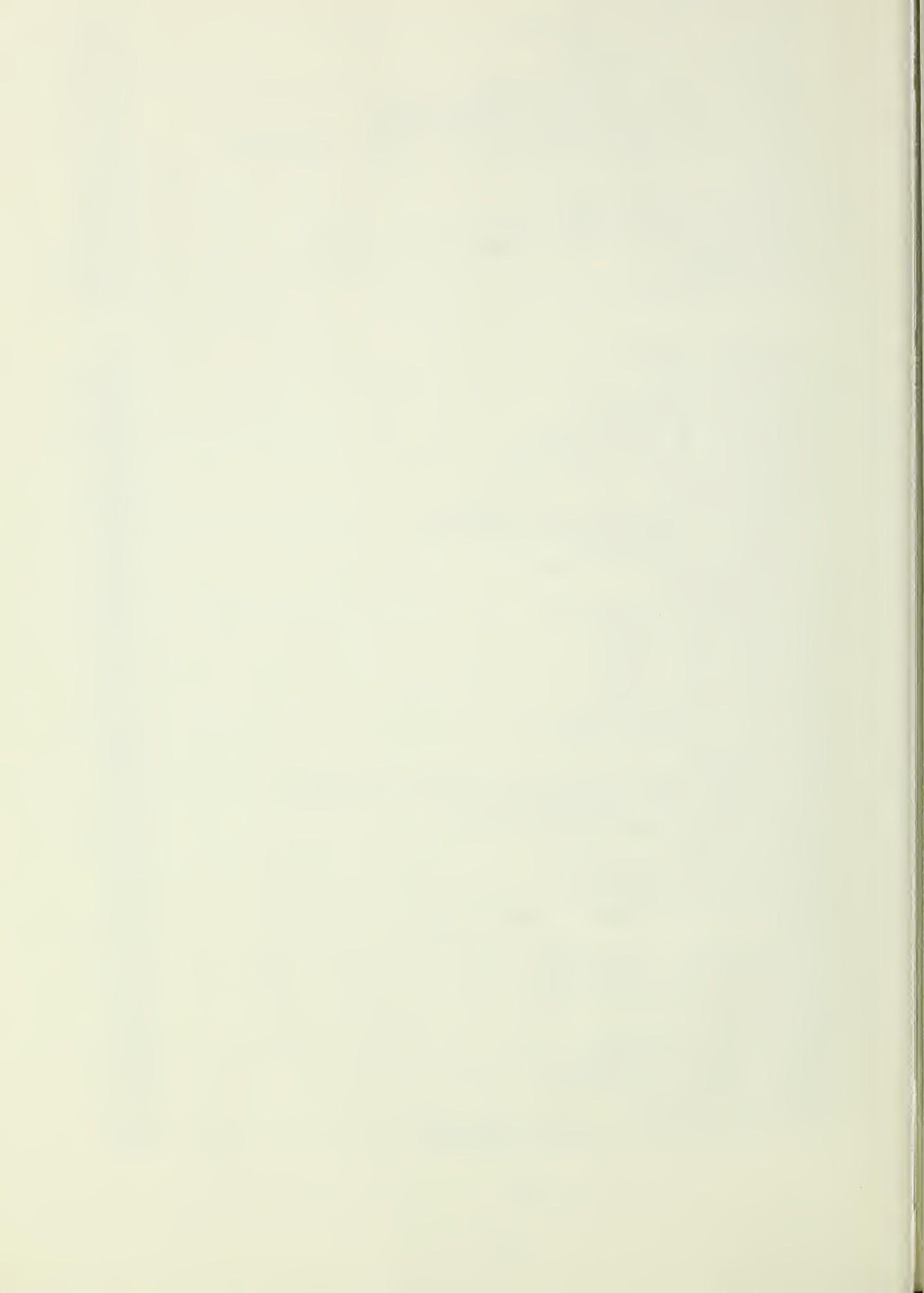
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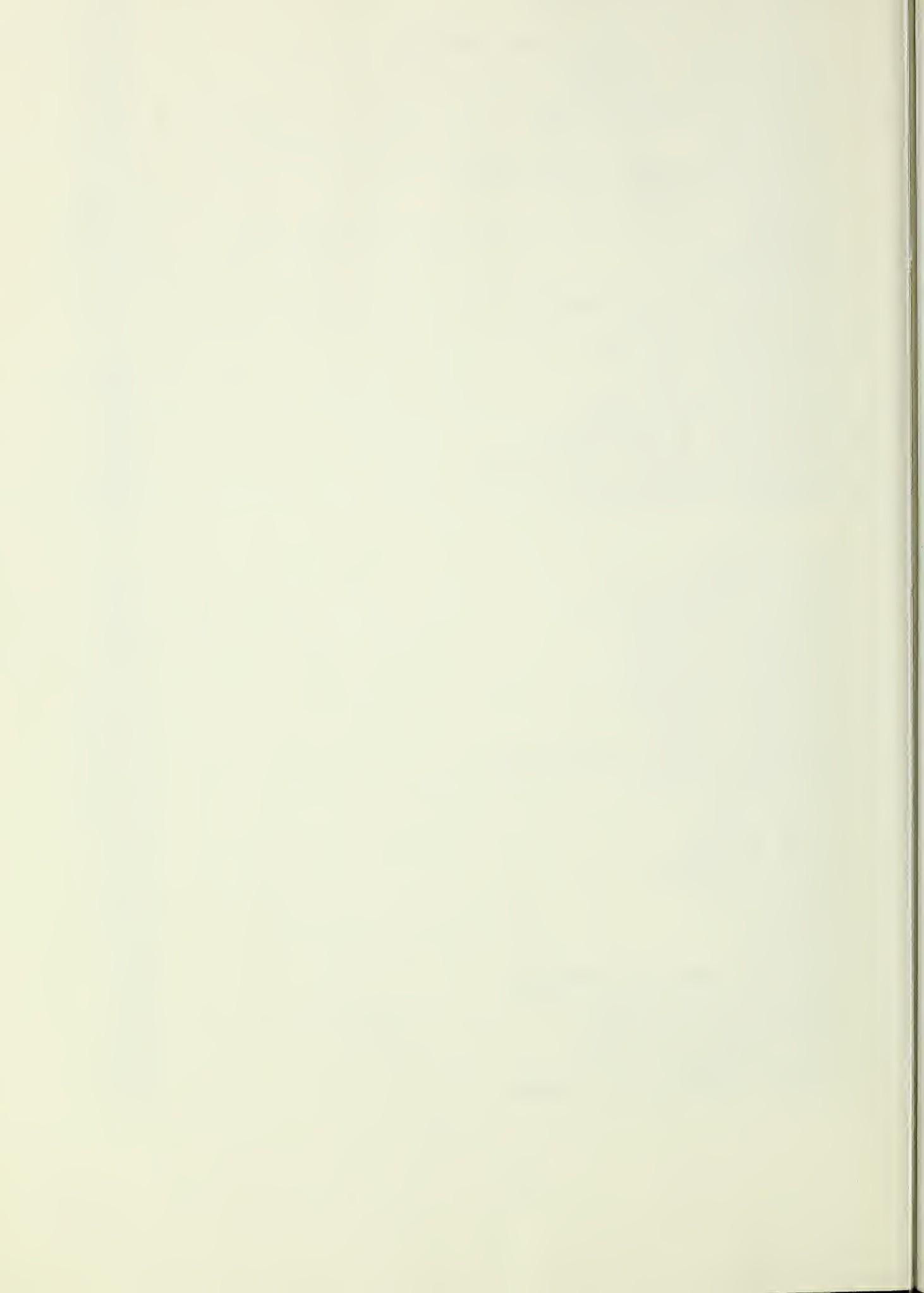


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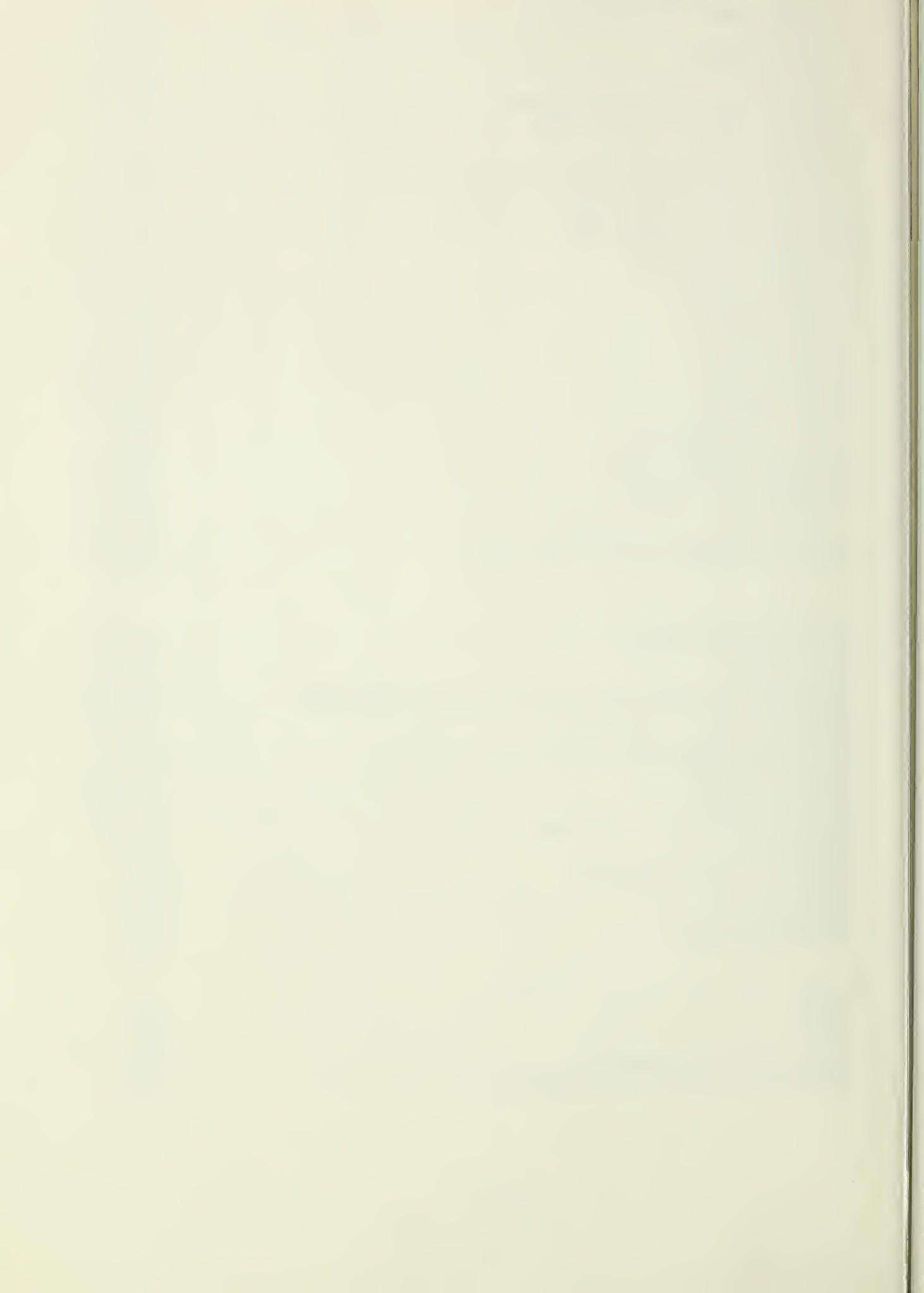
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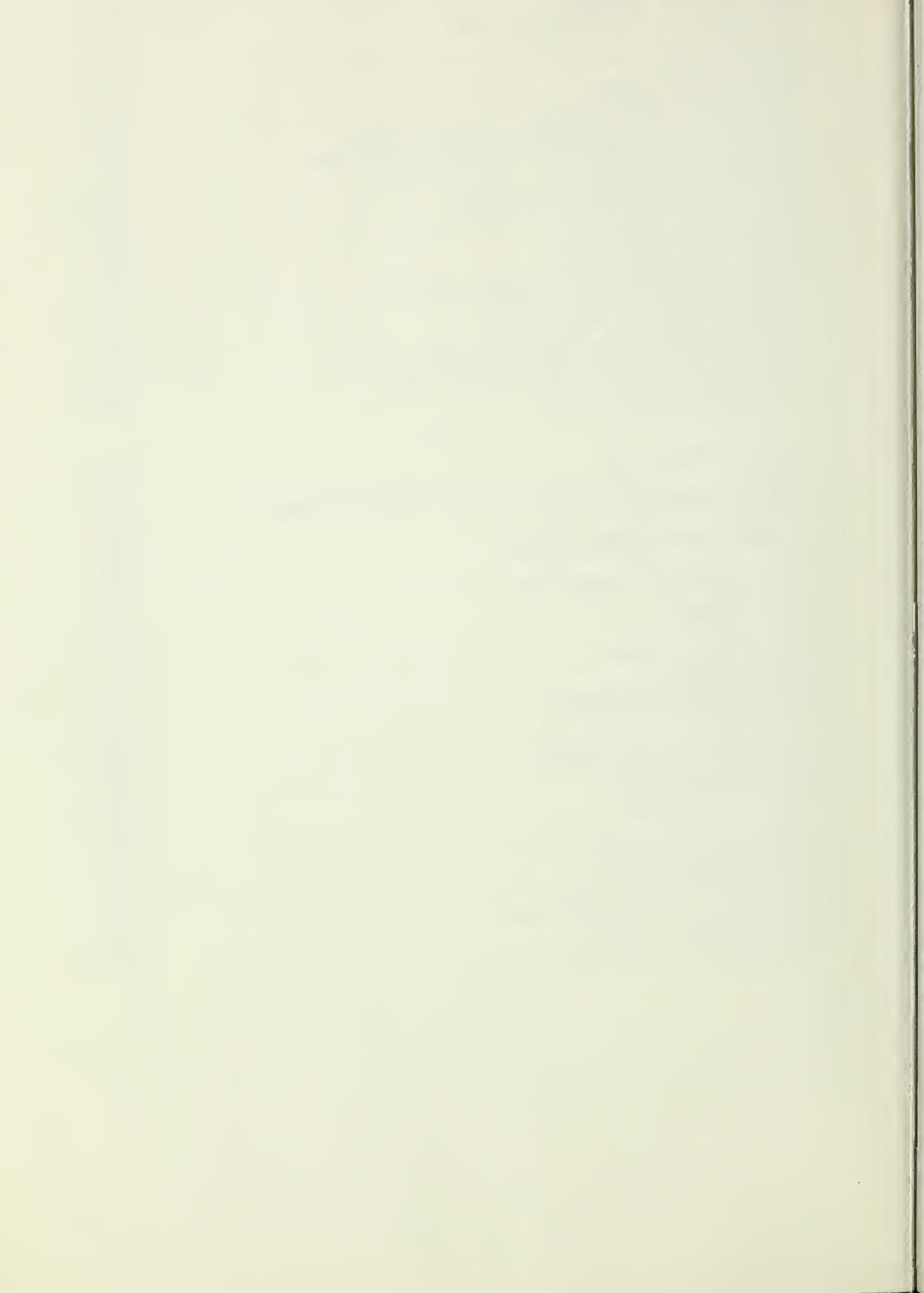
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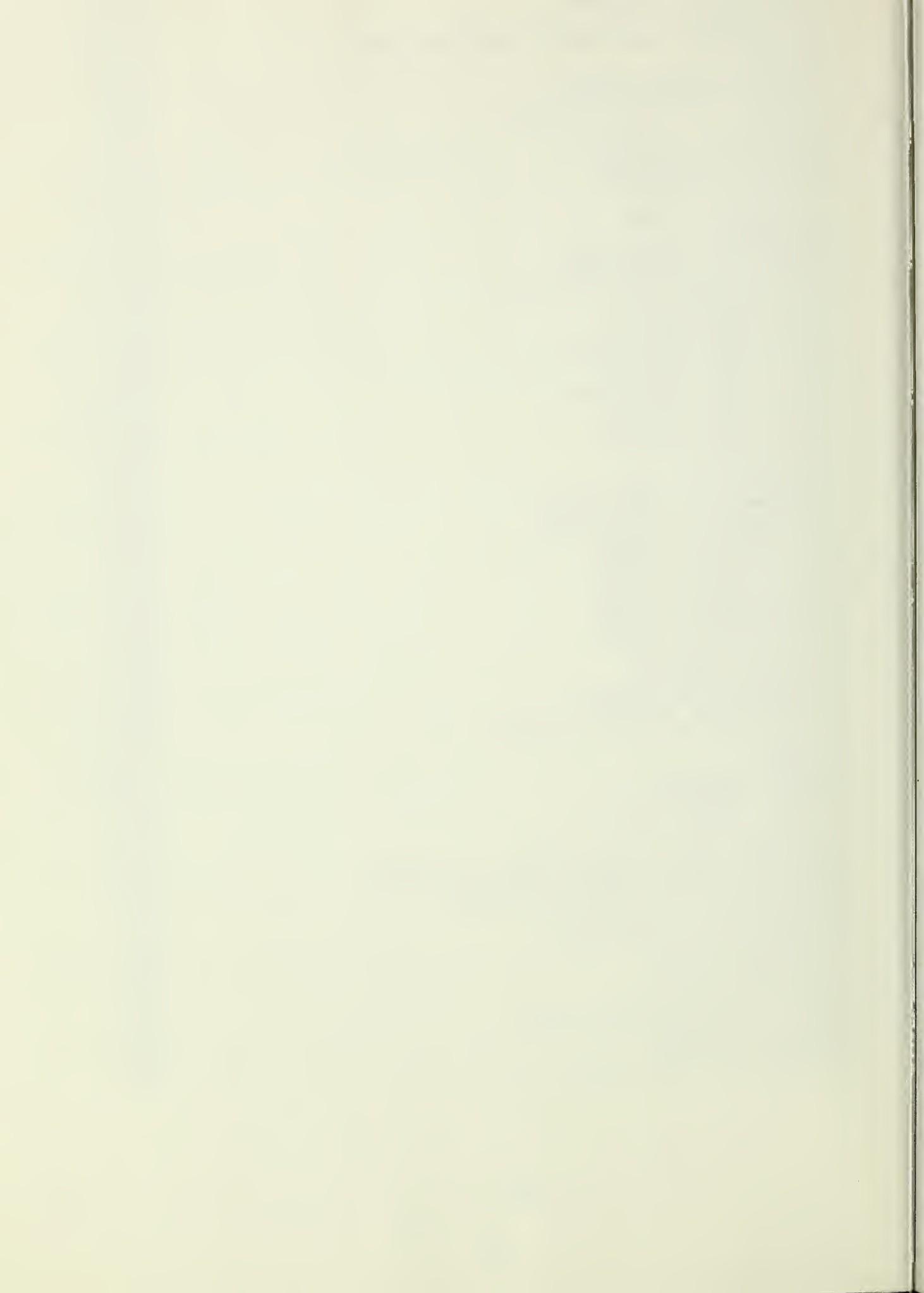
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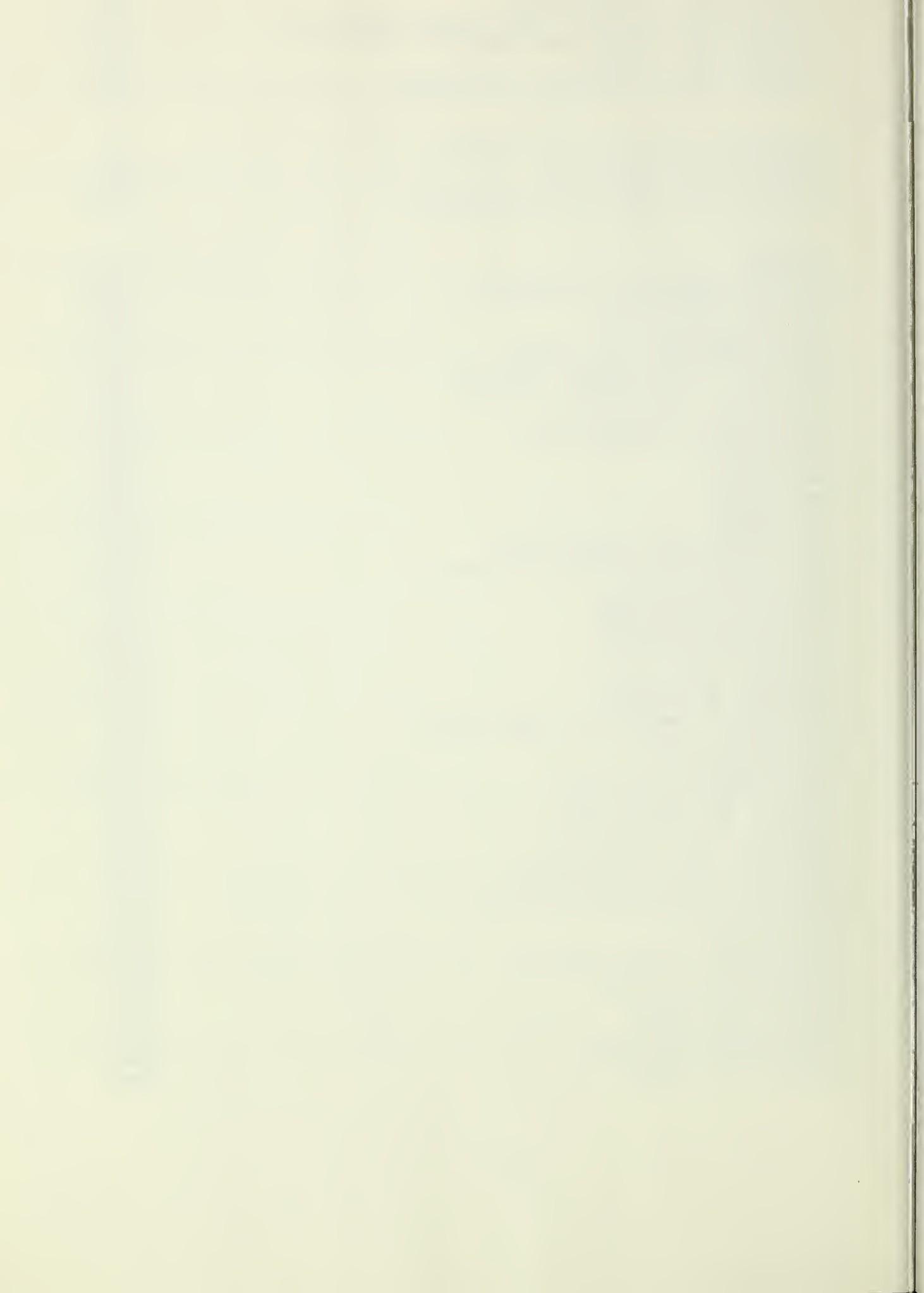
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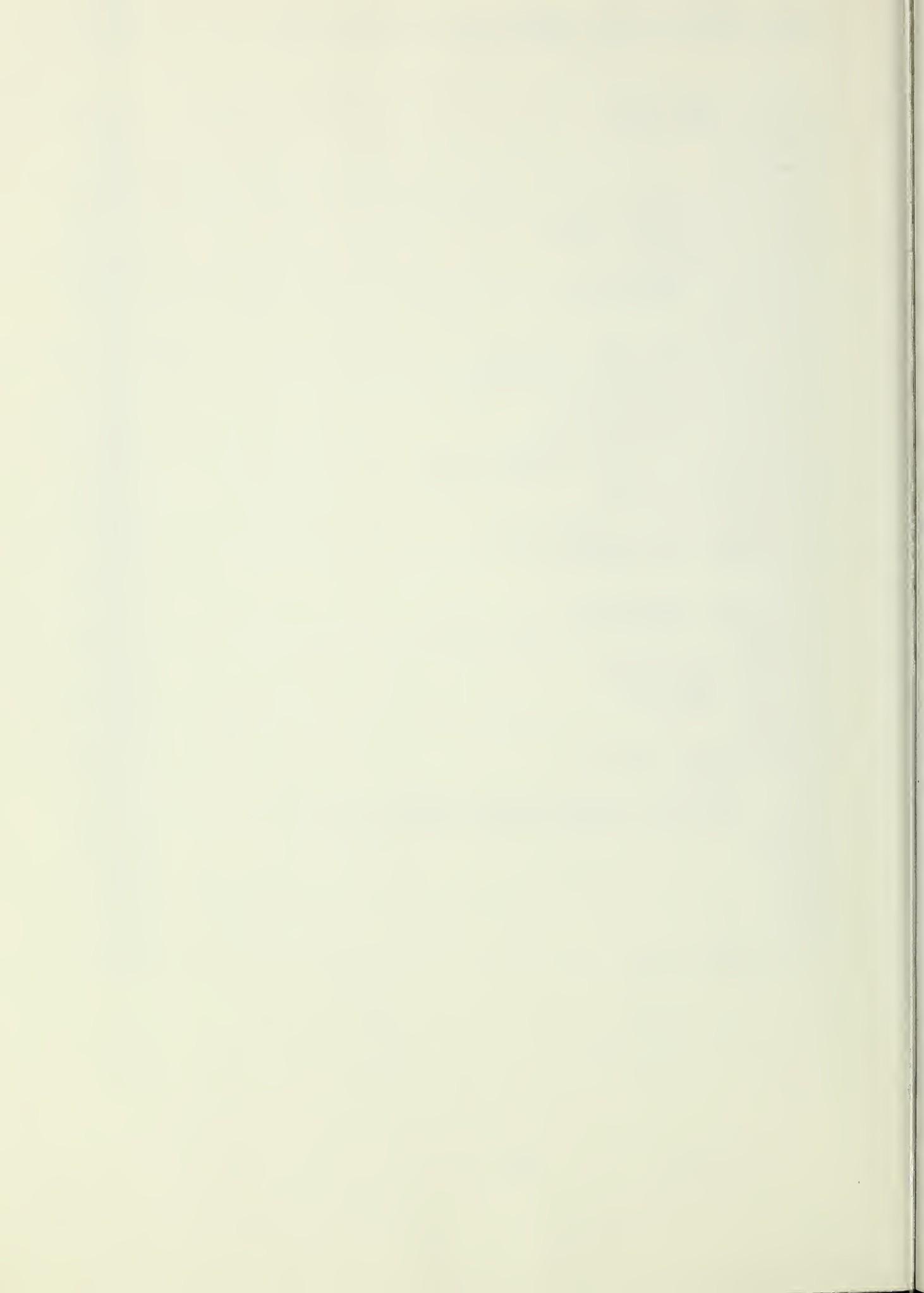
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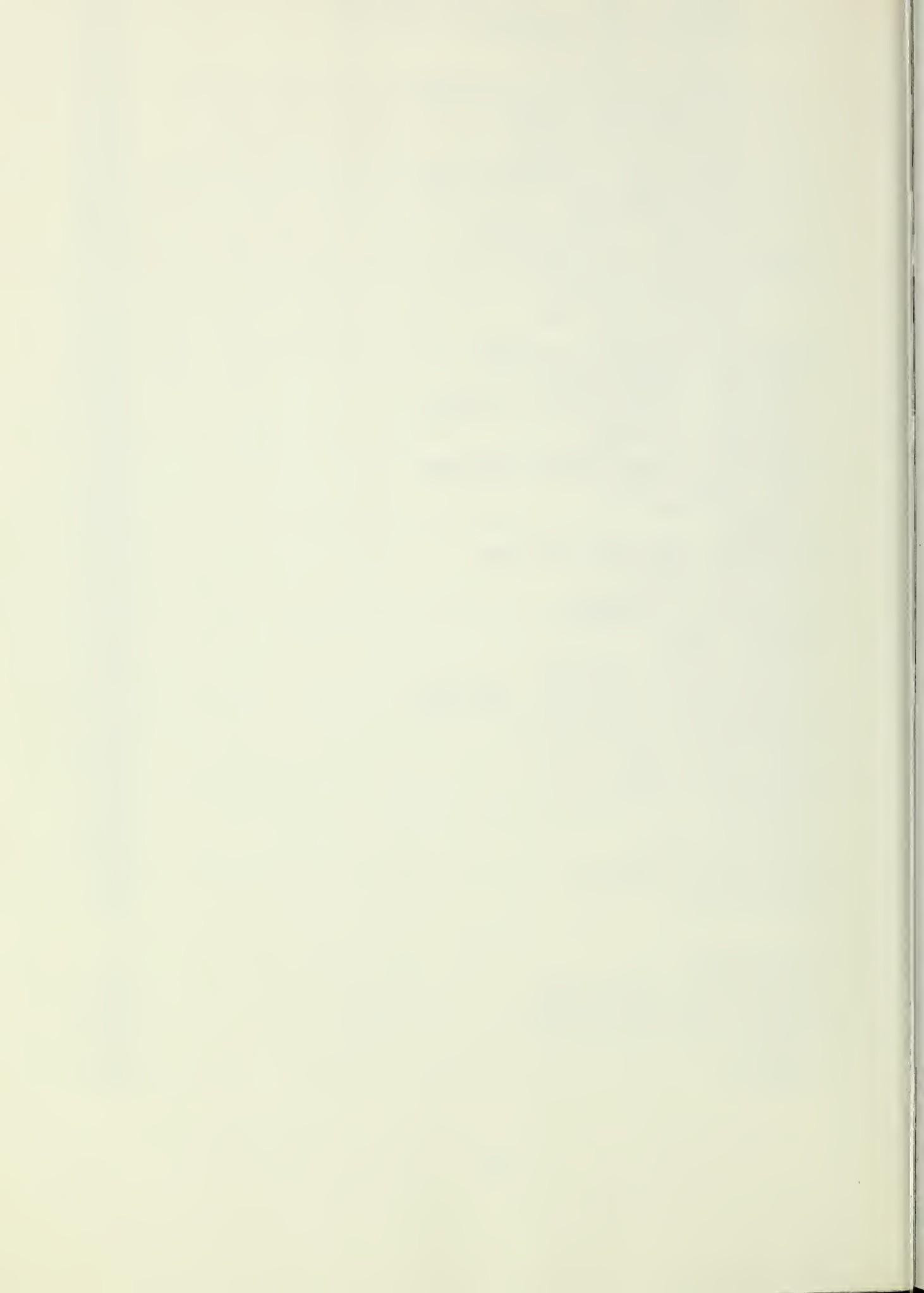
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